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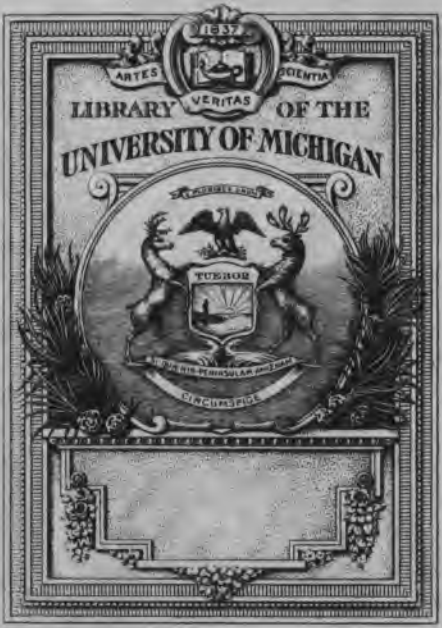
HYGIENIC LABORATORY—BULLETIN No. 121
SEPTEMBER, 1920

THE GENERIC NAMES OF BACTERIA

By
ELLA M. A. ENLOWS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1920



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By
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THE GENERIC NAMES OF BACTERIA.

By Ella M. A. Enlows, *Bacteriologist, United States Public Health Service.*

The list of generic names submitted here is as complete as careful search through bacteriological literature can make it. If further time were available additional names might be found. However, those familiar with the voluminous bacteriological literature of to-day will realize that the omission of a name is not intentional nor the result of neglect.

The work was begun [in the Laboratory of Dr. Erwin F. Smith, U. S. Department of Agriculture] in 1915 with Mr. E. C. Kellogg, then biological chemist, Bureau of Plant Industry, who was obliged to discontinue it on entering the service of the United States Army. It is only at his request that his name is not included in joint authorship. Several of the German translations were made by him, and the author acknowledges her indebtedness. A number of names were furnished by Capt. M. W. Lyon, jr., Medical Corps, United States Army, who also suggested the problem and assisted greatly throughout the work by much helpful criticism.

I am indebted to Mr. Conrad Kinyoun, of the Hygienic Laboratory, for much valuable assistance in reading the proof of this manuscript. Also, much gratitude is expressed for the assistance received from my husband, Mr. H. F. Enlows. His aid in the translation from Spanish and Portuguese, and in proof reading was extremely helpful.

Many valuable criticisms have been received from Dr. C. W. Stiles, Assistant Surgeon General, United States Public Health Service, particularly with reference to type citation. The species index was also arranged at his suggestion. The rules governing type citation which the author has endeavored to follow are those outlined by Dr. Stiles in "The International Code of Zoological Nomenclature as Applied to Medicine," Hygienic Laboratory Bulletin No. 24, Washington, D. C., September, 1905, pages 26 to 28. The different articles of the Botanical Code (International Rules of Botanical Nomenclature, Vienna, 1905, and Brussels, 1910. See also Rhodora, v. 9, No. 99, pp. 29–52, Providence, 1907) point out many ways in which numerous genera here listed should fall by the wayside. Binomial combinations frequently are not considered essential by authors forming these genera, simply the generic name being used, or an unsightly, "phonetically discordant" trinomial is written. In such cases further search has been undertaken in an effort to find the earliest binomial combination, and those which have been found are included.

Descriptions of the genera, though in many instances meager and indefinite, are included; in these descriptions morphology plays the chief rôle, largely because the earlier bacteriologists laid little or no emphasis upon constant physiological differences. It is to be hoped that the many inadequately defined genera here listed may serve as glowing examples of errors to be avoided by future contributors. A plea is made, too, for the introduction of generic names which are descriptive, since names of this sort define and, in a way, classify. Proper names converted by the addition of "inia," "ella," etc., as, for example, in *Pasteurella*, are very alluring because of their acknowledgment of the debt we owe our leaders, but they are not descriptive terms and offer no aid whatever to any system of classification. Terms such as *Aplanobacter*, *Rhodococcus*, *Hemophilus*, etc., are definitely descriptive. However, the majority of investigators agree that merely a name which is stable is sufficient. In fact, the committee on classification of the Society of American Bacteriologists (J. Bact., v. 2, No. 5, Baltimore, 1917, p. 530) state that "The name need not be appropriate; it need only be stable. It is an arbitrary label, not a description." Dr. C. W. Stiles (Hygienic Laboratory Bull. 23, Washington, D. C., 1905, p. 44) expressed a similar view a number of years earlier: "It is essential to recall that names are not definitions; they are simply handles by which objects are known." A divergence of opinion with such distinguished investigators is expressed with the utmost respect for their views, and not with any suggestion of making changes in names of universal acceptance. The writer does feel, however, that future classification will be easier and will more adequately fulfill the purpose of classification—that of simplifying our surroundings—if the new names introduced are well-chosen, descriptive terms. We are living in a busy age, when even minutes are jealously guarded. If a few letters can be rearranged so that they tell us several facts instead of one, why not use the better combination? *Streptococcus hemolyticus* certainly is rich in meaning compared with *Jonesiella browningi.*

The descriptions have been taken from the original texts when these could be procured anywhere in the United States. Otherwise the authority is given supporting the description quoted.

The author's own words have been inserted where there was any doubt as to the meaning. It should not be forgotten that in the early days of bacteriology but little was known about these minute plants, and the published information concerning them is in many cases so meager and so frequently contradictory that it is very difficult to isolate facts. The earlier bacterial genera were included among animals of various types and they are with difficulty separated. The first descriptions are those of Müller, who in 1773 published descriptions of these minute organisms as a part of the group of infusoria, *Infusoria crassiuscula*, establishing the two genera *Monas* and *Vibrio*. He defines them as "simple, inconspicuous worms." Bory de Saint-Vincent in 1824–1830, in his classification of the "Animaux Microscopiques," placed the bacteria in two different families of the order Gymnodes—Vibrionides and Monadaires.

Ehrenberg in 1828 defined the genus *Bacterium*, placing it among the "Phytozoa," family Vibrionia of the large class "Animalia Evertebrata." In 1838 (Die Infusionsthierchen) he retained the family name Vibrionia, and included under it the 5 genera: *Bacterium*, *Vibrio*, *Spirillum*, *Spirochaeta*, and *Spirodiscus*, excluding at this time *Monas* Müller. His description of the Vibrionia is interesting: "Animals, filiform, distinctly or apparently polygastric, no mucous membrane, naked, without external organs, with the body uniform or united in chains or filiform series as a result of incomplete division." The presence or absence of the more or less numerous stomachs which he ascribes to some of his species, together with the "proboscis" and "tail" occasionally mentioned, evidently have a more modern interpretation. His drawings, however, are excellent, often very illuminating, and more to the point than his lengthy descriptions.

The family Vibrionia was retained by Dujardin (1841) among the infusoria, and characterized as follows: "Animaux filiformes extrêmement minces, sans organisation appréciable, sans organes locomoteurs visibles." Under his definition of *Spirillum*, *Spirochaeta plicatilis* Ehrenberg became *Spirillum plicatile*.

Robin (1853) was one of the first investigators to point out the relationship of the bacteria to *Leptothrix*, then described as a plant. Davaine, also, in 1859, pointed out that the "vibrioniens" were "vegetables," closely related to the algæ, and especially to the Confervae. He included under the "Bactéries": *Bacterium*, *Vibrio*, *Spirillum*, and his new genus *Bacteridium*. Following Davaine, Hoffmann in 1869 demonstrated that the bacteria are plants possessing a very distinct cellular organization, and classified them according to their form and size into monads and linear bacteria, subdividing the latter into microbacteria, mesobacteria, and megabacteria. He included *Leptothrix* among the linear bacteria. Motility he decided to be a nonspecific characteristic, since it varied with temperature, density of medium, etc. Hallier's voluminous papers (1866–70) on the microorganisms found in several contagious diseases, though indefinite and confusing, undoubtedly brought the spherical bacteria into prominence, as Hoffmann, Cohn, and Billroth adopted at once his name *Micrococcus* for the round forms.

Nägeli in 1857 believed that the bacteria belonged with the fungi and coined the name Schizomycetes. Cohn, to whom is due the credit for the first "usable" classification, several times discussed the relation of the bacteria to the fungi and to the algæ, and concluded that if the absence of chlorophyll alone is to place a genus either with the algæ or with the fungi, then the greater part of the genera of bacteria must go with the fungi.

Cohn's first classification was based chiefly upon the presence or absence of zoogloeae (Beiträge z. Biol. d. Pflanz. v. 1, H. 2, 1870–1875). Later (idem, H. 3) he classified the bacteria with the algæ, placing them under the "Schizophytes," including all the lower plant forms, provided or not with chlorophyll, multiplying by fission. He formed two tribes: Gloegenae (nonfilamentous) and Nematogenae (filamentous), and placed each bacterial genus beside its nearest algal relative.

Zopf, in 1883, separated the fission-fungi from the fission-algae. He made four large groups: Coccaceae, bacteriaceae, leptothriceae, and cladothriceae, and greatly emphasized pleomorphism. Zopf in his classification also differentiated the spore-forming and the non-spore-forming organisms. Van Tieghem and de Bary followed in the footsteps of Zopf. De Bary (1884) made two large groups: Organisms producing endospores, and those producing arthrospores.

Hueppe followed Zopf, but separated the spiral forms, forming the new group: Spirobacteriaceae.

Thaxter in 1892 added to the groups then included under the bacteria organisms characterized by a strong resemblance to the Myxomycetes, which he placed under a new family of the bacteria: Myxobacteriaceae (see *Myxobacter* and *Myxococcus*).

Migula in 1894 substituted motility for spore formation as a distinctive characteristic, and his classification as published in 1900 has been rather generally followed in the bacteriological literature of this country.

Morphology and spore formation were used as the basis for the classification published by Lehmann and Neumann in 1896, making a separate group for the true-branching thread-like cells—Actinomycetes.

Kruse in 1896 included physiological characters in his classification, but made little use of them generically.

The most radical departure from the earlier classifications is that of Jensen in 1909 (Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 308). He makes use of the arrangement of flagella, not their presence or absence, dividing the bacteria into two orders: Cephalotrichinae (monotrichiate or lophotrichiate), and Peritrichinae (peritrichiate or nonmotile). The former are the more primitive and are typically water organisms, deriving energy chiefly by oxidative processes, while the Peritrichinae are later forms which split carbohydrates or amino acids. He divides these orders into families and genera according to their biochemical characters. He created a number of new genera to which he assigns names formed by combining terms, e. g., " monas " for polar-flagellate rod forms, with some term expressing the chemical activity of the organism, " Methanomonas ", " Carboxydomonas," etc.

The committee of the Society of American Bacteriologists on Characterization and Classification of Bacterial Types in 1917[1] proposed a new system of classification which they state " shall include what is valid and discard what is arbitrary in the older classifications—with no idealistic conceptions, either morphological or physiological in mind—but with the sole purpose of recognizing and defining the principal groups of bacteria which exhibit circumstantial evidence of common evolutionary relationship." Buchanan (J. Bact. v. 2, No. 2, March, 1917), who was a member of this committee, formed the basis of the classification by dividing the Schizomycetes into six principal groups (orders): *Eubacteriales*, *Thiobacteriales*, *Myxobacteriales*, *Chlamydobacteriales*, *Actinomycetales*, and *Spirochaetales.*

He describes these orders as follows:

1. The true bacteria which include the forms most commonly studied in the laboratory; they are probably more primitive than more highly differentiated groups.
2. The thiobacteria characterized by certain relationships to sulfur. They all grow best in the presence of hydrogen sulfide, and always contain sulfur granules or bacteriopurpurin or both.
3. The myxobacteria showing a pseudoplasmodial stage, and fruiting stages resembling in some respects those of the slime molds.
4. The iron bacteria[2] usually sheathed, frequently growing in water containing iron and with a deposit of iron oxide in the sheath; typically water forms without true branching, showing relationships with the algae.
5. The thread bacteria or ray fungi which show a filamentous form, frequently with true branching. Not water forms. As a group intergrading with the fungi.
6. The spirochetes, slender organisms usually spiral and frequently flexuous, showing many characteristics relating them to the protozoa.

Under the *Eubacteriales* he placed the families *Coccaceae*, *Bacteriaceae*, *Spirillaceae*, *Nitrobacteriaceae.* His studies on the nomenclature and classification of the bacteria,[3] in which he details the subgroups and genera of these families, contain the synonymy of many of the generic names here included. The Winslows (Science, n. s., 1905, v. 21, p. 669; J. Infect. Dis., Chicago, 1906, 3, p. 485) also contributed to the scheme adopted by the committee on classification, in their valuable, comprehensive studies on the Coccaceae.[1]

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[1] J. Bact., v. 2, No. 5, September, 1917, p. 505. See also J. Bact., v. 5, No. 3, 1920, p. 191.

[2] Ellis: Cent. Bact., abt. 2, v. 19, 576.

[3] J. Bact., v. 2, Nos. 4, 6, 1917, and v. 3, No. 1, January, 1918.

It seems evident that the bacteria can not be classified definitely by means of either morphological or physiological characters alone, but by a happy combination of both. Variations occur in both directions, but the wonderful strides being now made in biological chemistry make it seem fairly safe to assume that in the future we shall be able to make use of physiological differences which will be constant. Possibly it would be better to say "protoplasmic" differences in order to be in harmony with the majority of modern biologists who believe that no broad line of demarcation can be made between morphological and physiological characters, since both reside in the chemical properties of the protoplasm.

In all cases of doubt as to whether a certain genus should be included among the bacterial genera listed here, the plan has been followed of retaining the name, preferring that some more skilled investigator should do the discarding. A few of those included are considered by their authors as members of the Hypomycetes or of the Protozoa, but other investigators place them among the "higher bacteria," so it seems necessary to list them as belonging to the bacteria until their life histories have been more carefully studied.

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[1] See also Winslow, Rothberg, and Parsons, J. Bact., v. 5, No. 2, 1920, p. 160. Recently Orla-Jensen (Mém. de l'Acad. Roy. d. Sci. et d. Lettres de Danemark, Copenhagen, 1919, Sec. d. Sci. 8 me sér., v. 5, no. 2, pp. 81–196) has contributed an exhaustive study of the lactic acid bacteria, which he defines as including nonmotile, nonspore-forming Gram positive rods or cocci which ferment sugars chiefly to lactic acid. He divides the true lactic acid bacteria into 5 genera: *Streptococcus, Betacoccus, Thermobacterium, Streptobacterium*, and *Betabacterium*. Two other allied genera, *Tetracoccus* and *Microbacterium* are described as forming catalase, reducing nitrates and producing surface growth in stab culture. Winslow (Abstracts of Bact., v. 4, February, 1920, p. 102) thinks Jensen *Betacoccus* is the *Leuconostoc* of van Tieghem, and that his *Thermobacterium* is *Lactobacillus* Beijerinck.

GENERIC NAMES.

Acetimonas: Jensen,[1] 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1908–9, p. 312. Monotrichiate or nonmotile rods, forming a pellicle on liquid media, and capable of oxidizing ethyl alcohol to acetic acid and water. Includes *Bacterium aceti,* and *B. schuzenbachi* here.

Acetobacter: Beijerinck, 1898 (?).

According to Kral's Sammlung v. Mikroorg. Prague, 1898, pp. 7 and 8. *A. pastorianus* (Hansen?) Beijerinck, and *A. aceti.* See also Arch. néerl. d. sci. exact. et Nat., sér 2, v. 6, 1901, p. 212, where Beijerinck states that he uses this name for a group of organisms forming acetic acid from sugar. See also Centralbl. f. Bakt., Abt. 2, v. 29, 1911, p. 171: *A. melanogenum,* a bacterium found in sour beer, producing a brown pigment in beer gelatin.

Acetobacterium: (Beijerinck) Hoyer, 1898.

Hoyer (Beijerinck's assistant) : Centralbl. f. Bakt., Abt. 2, v. 4, 1898, p. 870. *A. xylinum* (Brown). See also Ludwig, in Zeitschr. f. Pflanzenkr., v. 9, Stuttgart, 1899, p. 11.

Achromatium: Schewiakoff, 1893.

Über einen neuen Bacterienänlichen Organismus des Susswassers. Schewiakoff. Heidelberg, 1893, 33 pp., 1 pl.

Type species (monotypy).—*A. oxaliferum,* Schewiakoff. Of all possible sizes and forms. Usually cylindrical with rounded ends; ellipsoidal and very small spheroidal forms also frequently found. Multiplication by transverse division. Varies in size from 0.15 by 0.009 mm. to 0.43 mm. by 0.009 to 0.022 mm. Only the cylindrical cells are motile. Calcium oxalate granules usually may be observed. The organism possesses a peculiar central body, surrounded by a layer of protoplasm of radial, netlike structure. He thinks this body is probably a nucleus.

Schewiakoff lays much stress upon the fact that his new genus represents an entirely new type of organism through the possession of a peculiar spherical central body having a honeycomblike, granular structure. Beyond the netlike layer of protoplasm (Rindenschicht of Bütschli) is the outer membrane which does not give the blue cellulose reaction. If the " Inhaltskörper " are dissolved in water crystals of calcium oxalate separate out.

Actinobacille: Lignières and Spitz, 1902.

Revista Soc. Med. Argentina. v. 10, Buenos Aires, 1902, p. 5. See also Bull. Soc. Cent. Med., v. 56, n. s., Paris, 1902, p. 487. Pleomorphic. Sometimes rodlike, sometimes coccuslike, in pairs; also streptobacillary forms occur; 0.15μ to 1.25μ in length by 0.4μ; nonmotile; no spores; gram negative; bipolar staining. The final stage of growth gives rise to little masses, in which the organisms are pressed closely together, giving the raylike aspect. These masses consist of a central germinative zone and an outer or vegetative zone. Cause of actinobacillosis in cattle.

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[1] Throughout the text the name " Jensen " should read " Orla-Jensen."

Actinobacillus: Brumpt, 1910.

According to Précis de Parasitol. E. Brumpt, Paris, 1913, p. 963.

Names the organism described by Lignières and Spitz, 1902. Causing a disease clinically identical with actinomycosis.

Type species (monotypy).—*A. lignieresi.* Streptobacillary, bacillary or coccoidal in form. Gram negative. Never filamentous.

Actinobacter: Ducleaux, 1882.

Ann. de l'Inst. Nat. Agron., sér. 1, No. 5, 4e Ann. 1879–80, Paris. 1882, p. 110.

Type species (monotypy).—*A. polymorphus.* Polymorphic. Non-motile, very thin small rods 2 to 3µ long, surrounded by a hyalin, oval or round, gelatinous envelope 5 or 6µ long. The organism gradually passes over into very short cylinders not more than 1µ long, which are not capsulated. No capsule ever forms in Liebig's bouillon, where the organism may reach 10µ in length. Aerobic. Multiplication by transverse division. Transforms the casein of milk into a water-soluble albuminoid, and milk-sugar into alcohol and acetic acid. Found in milk.

Actinobacterium: Haass, 1906.

Centralbl. f. Bakt., Abt. 1, v. 40, orig., 1906, p. 185. A genus closely related to *Corynebacterium* Lehmann and Neumann, *Mycobacterium* Lehmann and Neumann, and *Actinomyces* Hartz. These, together with his new genus he places in a group between the Schizomycetes and Hyphomycetes.

Actinobacterium:

A. lactis viscosum (Adametz, Ducleaux) Reitz, 1906. Centralbl. f. Bakt., Abt. 2 v. 16, Jena, 1906, p. 731.

Actinobacterium:

A. israëli, var. *spitzi* Sampietro, 1908. Ann. d. 'Ig. sperim. v. 18, n. s., 1908, fasc. 3, p. 331. The type here is the Wolf-Israël *Actinomyces* (according to Sampietro), the species being very similar to the *Streptothrix spitzi* Lignières and Spitz. The author states that he is following Haass.

Actinocladothrix[1]: Affanassiew and Schulz, 1889.

Centralbl. f. Bakt., v. 5, 1889, p. 684. See also Wratsch, No. 2, 1889, p. 24, and St. Petersb. Med. Wochenschr. Jahrg. 13, n. s., v. 5, 1888, pp. 76 and 83. An organism obtained in pure culture from 3 cases of Actinomycosis (2 from pus and 1 from sputum). In bouillon a sediment is formed, consisting of gray-white granules, often coalescing. On blood serum these granules are yellow. The " grains " are 1/10 to 1 mm. in size, consisting of slightly twisted threads, which radiate from the center outward, and divide dichotomically at the periphery. In older cultures undoubted swelling of the threads was observed, but no knoblike enlargements.

Actinocladothrix: Haass (?), 1906.

A. nocardi, Centralbl. f. Bakt., Abt. 1, v. 40, 1906, p. 181. He does not claim the authorship of this species, merely stating that it is synonymous with an Actinomyces isolated by him from the air.

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[1] In a footnote on p. 84 of the earlier reference Affanassiew gives the name *Bacterium actinocladothrix,* but on p 684 of the Cent. f. Bakt., v. 5, 1889, he and Schulz are reported as stating at the third Congress of Russian Physicians in Petersburg that "Auf Grund der Biologischen Eigenschaften schlagen Verfasser vor die Actinomyces als Actinocladothrix zu bezeichnen."

Actinomyce: Meyen, 1827.

Linnaea, v. 2, Berlin, 1827, p. 442. Described by Meyen as a fungus. Sporidochia, cellulis hyalinis simplicibus enormiter et multipliciter ramificantibus sporis impletis, substantiae uniformi gelatinosa hyalina induta.

Type species (monotypy).—*Actinomyce horkelii.* R. forma irregulari sphaeroidea, gelatinosa duritie ad basin augente usque ad consistentiam cartilaginosam, colore hyalino-subcoeruleo. Hab. in pinguedine et pleuris animalium aquae submersis, autumno prope Coloniam Agrippinam. Merrill and Wade (The Philip. J. Sci., v. 14, no. 1, Manila, 1919, p. 65) consider that this description "apparently applies to one of the colonial *Cyanophyceae.* * * * The description of both the genus and the species is indisputably valid, and in the present connection the question of its identity is unimportant. In being validly published, it invalidates the further use of the same name for another group of organisms in the plant kingdom."

Actinomyces: Harz, 1877.[1]

Jahresb. d. Kais. Cent. Thierarznei-Schule in München. *In* Zeitschr. f. Thiermed. u. Vergl. Path. Bollinger and Frank, v. 5, Leipzig, 1879, p. 125. Colonies light yellow, roundish, glandular, often united into mulberrylike masses of 1 mm. or more in diameter. Upon slight pressure the spherical colonies break up into numerous, unequal, mostly wedge-shaped segments with rounded ends, 10 to 15 to 50μ in length. At the pointed end of the wedge a conical basal cell is later formed, which bears 2 to 9 or more short-membered hyphae, which give rise in a somewhat irregular manner to a number of duplicating series of dichotomously branched arms. On the branched ends of the homogeneous or finely granular hyphae the short-stalked gonidia are found, single or united into 2 to 3 membered chains. The gonidia are polymorphous, oval, round, or longish club-shaped forms. From these gonidia develop long cylindrical tubes, at the anterior end of which the same process is repeated until the fungus has reached its normal size. See *Actinomyce.*

Type species (monotypy).—*A. bovis*, causing actinomycosis in cattle. (Hartz thinks it represents the conidial stage of a fungus.)

Aerobacter: Beijerinck, 1900.

Centralbl. f. Bakt., Abt. 2, v. 6, 1900, p. 197. See also Arch. Néerl. d. Sci. exact. et Nat. Sér. 2, v. 4, 1901, p. 7. Facultative anaerobic organisms which give the "white lead test" with production of sulfides, and certain related ferment organisms. No spores. Very resistant to drying. Ferment dextrose and levulose with production of gas and usually lactic acid. Sulfates not reduced. Nitrates reduced to nitrites, but not to NH_3.

Species.—*Bacillus coli commune* Escherich. Includes here also *B. liquefaciens* Tataroff, and *Bact. lactis aerogenes* Escherich, the latter becoming *Aërobacter aerogenes.*

Aethyl-bacillus: Fitz, 1878.

Ber. d. deutsch. chem. Gesellsch., v. 11, Berlin, 1878, p. 48. 1 pl. A bacillus forming ethyl alcohol from glycerin.

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[1] It should be noted that the majority of investigators have endeavored to divide the group of organisms variously defined as *Actinomyces*, *Streptothrix*, *Nocardia*, *Discomyces*, etc., upon the following characters: Club formation of the filaments found in the granules; granule formation within the tissues; difficulty of cultivation on artificial media; anaerobiosis; presence or absence of arthrospores. Morphological differences seem to have been given but little weight. See *Discomyces.*

Agonium: Oersted, 1844.

De regionibus marinis, 1844, p. 44. According to Saccardo, Sylloge Fung., v. 8, 1889, p. 938. De Toni and Trevisan included this genus among the Schizomycetes as a "Genus incertae sedis." Filamenta cylindrica, articulata, simplicia, basi ab apice superiore distincta, e puncto centrali commune radiatim exorientia, caespites formantia. Sporae (endosporae) maximae, ovales singulae in unoquoque articulo obvientes. *Type species* (monotypy).—*A. centrale.*

Albococcus:[1] Winslow and Rogers, 1906.

Biological Studies by pupils of W. T. Sedgwick, Boston, June, 1906, pp. 202 and 205. See also J. Inf. Dis, 1906, p. 544, and Systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908. Parasites. Cells in groups and short chains (never in packets). Generally stain by Gram. Growth on agar streak abundant and porcelain white in color. Sugars fermented with production of a slight amount of acid. Gelatin liquefaction and nitrate reduction may or may not occur.

Type species (original designation).—*A. pyogenes* [*M. pyogenes* (Rosenbach) Migula]. Also include here *A. rhenanus* (Migula), *A. candicans* (Flügge), and *A. canescens* (Migula).

Amoebobacter: Winogradsky, 1888.

Beitr. z. Morph. u. Phys. der Bact., Leipzig, 1888, Heft 1, p. 71, pl. 3, figs. 1–8. Cells divide in one direction of space, usually round, and united into families by means of plasma threads. Families have amoeboid motion. In the resting state the extruded gelatin becomes stiffened, forming a firm 2-layered membrane. Sulfur granules here and there. Cell masses a delicate rose red.

Type species [subsequent designation by Buchanan (J. Bact. v. 3, No. 5, 1918, p. 469)].—*Amoebobacter roseus* Winogradsky. Cells spherical, 2.8 to 3.4μ in diameter. Winogradsky also includes here *A. bacillosus* (rodlike cells 2 to 4μ long by 1.7μ), and *A. granula* (cells spherical, exceedingly small—scarcely 0.5μ in diameter).

Amoebomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1908–09, pp. 331 and 334. Renames *Amoebobacter* Winogradsky.

Amylobacter: Trécul, 1865.

Compt. rend. Acad. d. sc. Paris, v. 61, 1865, pp. 156 and 432. See also idem v. 65, 1867, p. 513. Under this genus of "amyliferous plantules" he includes 3 types of bacteria: (1) tadpole-shaped group, *Urocephalum;* (2) a cylindrical form, usually attenuated toward one end, *Amylobacter*, and a spindle-shaped form, *Clostridium.* These 3 types he states may be considered as subgenera of his *Amylobacter.* Found in the putrefying cells of various species of flowering plants.

Amylobakter: Schattenfroh and Grassberger, 1899.

Cent. f. Bakt., Abt. 2, v. 5, Jena, 1899, p. 700. Variant of *Amylobacter.*

Aplanobacter: Smith, 1905.

Bacteria in Relation to Plant Diseases, v. 1, Carnegie Instit., Washington, 1905, p. 171. An unattached, nonmotile, rod-shaped organism, without chlorophyll; multiplying by fission; sometimes forming threads of considerable length.

Type species [original designation].—*Bacillus anthracis* Cohn.

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[1] This genus has been considered invalid by Winslow, Rothberg, and Parsons (J. Bact., v. 5, No. 2, 1920, p. 161). The type species *A. pyogenes* together with *Staphylococcus epidermidis albus* (Welch) Gordon, and *Albococcus epidermidis* the Winslows, becomes *Staphylococcus epidermidis.*

Arthrobacillus: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 136. Nonmotile rods with arthrospores.

Arthrobacter: Fischer, 1895.

Jahrb. f. wissensch, Bot., v. 27, Berlin, 1895, p. 141. Nonmotile rods, without flagella, without endospores, with arthrospores.

Fischer (p. 141) states *Arthrobacter* De Bary.

Arthrobacterium: De Bary, 1884.

According to Comp. Morph. and Biol. Fungi, Mycetozoa and Bact., Auth. Eng. rev. trans. by Garnsey, Oxford, 1887, pp. 454 and 468. This genus is proposed for that group of the genus *Bacterium* in which no endogenous spore-formation occurs. " To denote the species which constitute the genus *Bacterium* of authors, I use partly the generic name *Bacillus* * * * and partly the name *Arthrobacterium.* Single members may simply separate from their connections with others, and under suitable conditions become the initial members of new combinations; they have therefore claim to the name spore. In other respects there is no general characteristic distinction between them and the purely vegetative members."

Species.—*Bacterium zopfii* Kurth, *Bact. merismopoedioides*, *Bact. aceti*, and *Bact. pastorianum* Hansen.

Arthrobactridium: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 148. Cells straight, rodlike or short ellipsoidal. Division in but one direction. Motile. Arthrospores.

Arthrobactrillum: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 144. Cells straight, rodlike or short ellipsoidal. As for *Bactrillum* Fischer, but with arthrospores.

Arthrobactrinium: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 142. Cells straight, rodlike or short ellipsoidal. Motile. Arthrospores.

Arthrobakterium: Hueppe, 1886.

Die formen der Bakt. Wiesbaden, 1886, p. 145. Variant of *Arthrobacterium.*

Proc. Acad. Nat. Sci., v. 4, Phila., 1850, p. 227. See also A Flora and Fauna within living animals. By Jos. Leidy, Washington, Smithsonian Inst., April, 1853, pp. 33 and 34. Thallus attached by means of one or more granules, simple, cylindrical, very long, filamentous, articulate, without ramuli. Articuli indistinct with amorphous contents finally converted into solitary oval sporuli.

Arthromitus: Leidy, 1850.

Type species (monotypy).—*A. cristatus.*[1] Thallus very delicate, filamentous, linear, straight or inflected, flexible, colorless, translucent, obtusely rounded at the free end. Pedicle of attachment. One or more round or oval amber-colored granules. Articuli indistinct, but becoming well marked after the development of the interior sporular body. Spore oval, simple, faintly yellowish, translucent, highly refractive. Length 1/1500 to 1/12 inch. Breadth about 1/16250 inch. Hab. Parasitic, grows from the mucous membrane of the ventriculus and large intestine of *Julus marginatus*, *Enterobryus elegans*, *Ascaris*

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[1] Leidy later (p. 35 of v. 5, Proc. Acad. Nat. Sci.), named a second species, *A. nitidus*, but on p. 34 of second mentioned reference he states that *A. cristatus* and *A. nitidus* are identical, the much larger filaments of the latter having confused him.

infecta, etc. Leidy placed this species among the "Entophyta" allied to the Mycodermata. Buchanan (Meeting of Am. Soc. Bacteriologists, Dec., 1917, Wash., D. C.) placed it under the *Bacillaceae*.

Arthro-Streptokokkus: Hueppe, 1885.

Die Formen d. Bakt. By Ferd. Hueppe, Wiesbaden, 1885, p. 146. A subgenus of *Streptococcus*. "Die vegetativen zellen werden durch Kokkenformen gebildet." No spores. Zoogloeae moderate.

Arthrospirobacterium: This genus has been ascribed to Hueppe. In his "Die Formen d. Bakt.," Wiesbaden, 1885, p. 146, where he classifies the bacteria, he gives as "Gattung" III, Arthro-Spirobakteriaceen. The vegetative cells are screw-like rods. No endogenous spores. Arthrospores. He places *Spirochaeta* as a subgenus of this.

Arthro-Spirobacterium: Klebs, 1887.

Die Allg. Path., Jena, 1887, p. 88. In a résumé of Hueppe's classification, Klebs gives this spelling, and cites the 1881 edition of Hueppe's Die Formen d. Bakt.

Ascobacteria: van Tieghem, 1880.

Bull. Soc. Bot. de France, v. 27, Paris, 1880, p. 151. Colonies small, granular, polyhedral, enveloped in a cartilaginous, thick membrane, and united into larger groups. The contents of each compartment is composed of a great number of little rods, arranged in all directions, and intimately united by a sort of cement. When the colony attains a certain size it breaks into two parts, and the gelatinous membrane prolongs itself between the two surfaces. The single rods from such colonies may start new colonies.

Type species (monotypy).—*A. ulvina*.

Ascobacillus: Edington, 1887.

Brit. Med. J., London, v. 1, 1887, p. 1265, fig. 7. Small rods, 0.8μ long by 0.2μ broad, often dumb-bell shaped, made up of long ovoid spheres. Spores are contained in large sausage-shaped capsules many hundreds times larger than the bacilli themselves. Found in the blood of a patient dying of scarlet fever. De Toni and Trevisan (Saccardo, Sylloge Fungorum, v. 8, 1889, p. 1034) says it is synonymous with *Klebsiella edingtoni* Trevisan.

Ascobacillus: Unna and Tommasoli, 1889.

Monatsh. f. Prakt. Derm. v. 9, 1889, p. 60. Straight or bent bacilli, 1 to 3μ by 0.3μ, single or in twos, grouped or in bundles. Masses taken from agar present the appearance of *Ascococcus billrothii* Cohn. In the interior of these masses the bacilli are nonmotile, but at the periphery a whirling motion may be observed.

Type species (monotypy).—*A. citreus*. Produces a citron yellow color on media. Liquefies gelatin.

Ascobacterium: Babes, 1890 (?).

Cornil et Babes, Les Bactéries, 3 ed., v. 1, 1890, p. 155, fig. 54.

Type species (monotypy).—*A. luteum*. Bacilli straight, 0.4μ by 2 to 3μ long, surrounded by a large oval capsule. The bacilli are found at the periphery of the colonies, in the center of which is a large oblong capsule, almost visible to the naked eye, in which are ovoid masses 10 to 20μ, apparently consisting of agglomerated bacilli. Later the capsule is filled with recognizable bacilli not capsulated. Finally they become free and are then surrounded by a capsule. Nonpathogenic; obtained from the air.

Ascococcos: Billroth, 1874.

Unters. über die Vegetationsformen v. Coccobacteria septica, Berlin, 1874, p. 12, pl. 2, figs. 16–18. Cells small, hyaline, globular, closely united into spherical or oval colonies, surrounded by a thick, gelatinous envelope.

Type species (monotypy).—*A. parvus.* He follows this species name by Aethalium septicum.

Ascococcus: (Billroth) Cohn, 1875.

Beit. z. Biol. d. Pflanz. Cohn. v. I, 1870–75, pp. 151 and 154. Cellulae achromaticae minimae, globosae densissime consociatae in familias tuberculosas globosas vel ovales irregulariter lobatas, lobis in lobulos minores sectis, capsula globosa vel ovali gelatinoso-cartilaginea crassissima circumdatas, in membranam mollem facile secedentem floccosam aggregatas.

Type species (monotypy).—*A. billrothii* Cohn. Familiae tuberculosae 20 to 160μ, capsula ad 15μ crassae. In solutione ammonii tartarici acidi aere lavata sponte ortum, membranam odore lactico vel butyrico praiditam formantem observati Mart. 1874.

Ascococcus: (Cohn) emended Winslow and Rogers, 1905.[1]

Science, n. s. v. 21, 1905, p. 669. See also J. Inf. Dis. v. 3, 1906, p. 485, and the Systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908, and The Biological Studies of the Pupils by W. T. Sedgwick, Boston, 1906, p. 151. Generally saprophytic. Grow well on artificial media, producing abundant surface growth. Cells embedded in large, irregularly lobed masses of zoogloeae.

Ascokokkus: Klebs, 1887.

Die Allg. Path., Jena, 1887, p. 343.

A. johnei. Variant of Ascococcus.

Askokokkus: Hueppe, 1885.

Die Formen d. Bakt. Hueppe, Wiesbaden, 1885, p. 148. Variant of *Ascococcus.*

Astasia: Ehrenberg, 1831.

Abhandl. d. König. Akad. d. Wissensch. Berlin, 1831, p. 70. Belongs to the family "Änderlinge" or Astasiaea. Containing chlorophyll. A diatom? *A. euchlora,* etc.

Astasia: Meyer, 1897.[2]

Flora oder Allg. Bot. Zeit., v. 84, Marburg, 1897, p. 185, Pl. VI.

Type species (monotypy).—*A. asterospora.* Found on cooked carrots; 1 to 2 lateral flagella tufts on the normal, one-celled rod. Spores, a motile stage, a resting stage, sporangia. The spores germinate in about 6 hours. From these a very motile rod develops, which passes over into a resting stage, surrounded by a gelatinous membrane. Endospores develop later in these rods, giving them a spindle-shaped appearance. Rarely 2 spores form in one rod. Rods producing spores he calls *sporangia.* A nucleus was stained in all stages.

Asterococcus:[3] Borrel, Dujardin-Beaume, Jeantet, and Juan, 1910.

Ann. de l'Inst. Pasteur, Paris, 1910, p. 168.

Type species (monotypy).—*A. mycoides.* Polymorphic, diplococci, tetracocci, little chains, filaments with swollen ends, asteroids, vibrios, pseudo-vibrios, and forms with multiple polarity. Often the filaments are bifurcate and trifurcate. Nonmotile. The granular forms are often enclosed in a sort of sheath. When the filamentous form first appears it is granular; gradually the granulations disappear and the filaments become phantom-like, ramify, and star-like forms appear. These varied forms were observed under the ultra-microscope, and also by special staining methods. Cause of peripneumonia. The authors state that this genus is "the only filterable virus" which had been obtained in pure culture up to that date. The organism grew only in media containing serum or hemoglobin.

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[1] See Buchanan, J. Inf. Dis., v. 17, No. 3, 1915, p. 532.

[2] Buchanan [J. Bact., v. 3, No. 1, 1918, p. 38] makes this a subgenus of *Bacillus.*

[3] Buchanan [J. Bact., v. 3, No. 1, p. 44] places this genus under his new subtribe Hemophilinae.

Astrobacter: Jennings, 1896 (1898).

Proc. Roy. Irish Acad. ser. 3, v. 5, Dublin, 1898–1900, p. 312. (Paper was read Dec., 1896.) Diagnosis from stained specimens: Deeply stained starlike bodies composed of a varying number of rays, majority 8 to 10. Y-shaped forms, and also simple rods occur. Author thinks the Y-shaped form due to longitudinal splitting of the rod, as the branches of the fork are always equal, 4-rayed forms with acute and obtuse angles between the pairs of rays are not uncommon, with all transitions to a regular cruciate. In the hexactinellid forms some are irregular, others symmetric as a simple snow-crystal. A central colorless spot observed in a large number of specimens. The bases of the rays are rounded off and project somewhat into this light area, which in some cases communicates with the exterior. Found in stagnant water.

Aurococcus: Winslow and Rogers, 1906.[1]

Biological Studies by the Pupils of W. T. Sedgwick, Boston, June, 1906, pp. 201 and 205. See also Systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908. Parasites: Cells in groups and short chains, very rarely in packets. Generally stain by Gram. On agar streak good growth of orange color. Sugars fermented with formation of small amount of acid. Gelatin often liquefied very actively. May or may not reduce nitrates.

Type species (original designation).—*Aurococcus aureus* (Rosenbach).

Azotobacter: Beijerinck, 1901.

Centralbl. f. Bakt., Abt. 2 v. 7, 1901, p. 561. Thick diplococci or short rods 4 to 6μ or less. Sometimes much larger, often with vacuoles and a slimy cell wall. Motile by means of 1 or 4 to 10 polar flagella. No spores. Nonsymbiotically assimilates atmospheric nitrogen. *Hab.*—Soil.

Type species (subsequent designation, Buchanan, J. Bact., 3, No. 1, 1918, p. 47).—*A. chroococcum* Beijerinck. Only very few organisms of young cultures motile, majority nonmotile. Old cultures consist of micrococci of varying size forming sarcina-like packets. Beijerinck also included: *A. agilis* Beijerinck. Actively motile by tufts of polar flagella. Often with transparent cell wall; protoplasm granular, vacuoles.

Azotomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2 v. 22, Jena, 1908–9, p. 328. Polar flagellate bacteria, capable of oxidizing carbon compounds, reducing nitrate to nitrite and in part also further to ammonia. Renames *Azotobacter* Beijerinck.

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[1] Buchanan correctly points out that according to the botanical code (article 45) this genus is synonymous with *Staphlycoccus*, and should be abandoned as invalid. Winslow Rothberg, and Parsons (J. Bact., v. 5, No. 2, p. 161, 1920) also conclude that the genus is invalid and agreeing with the Committee Soc. Am. Bact. (J. Bact., v. 2, 1917, and v. 5, 1920) regard the species here designated *Aurococcus aureus* as the type of *Staphylococcus*.

Babesia: Trevisan, 1889.

Gen. e Spec. delle Batteriaceae, 1889, p. 29. According to de Toni and Trevisan: Saccardo's Sylloge Fung., v. 8, 1889, p. 1054. Cocci ellipsoidei, longitudinaliter binantim seriati (diplococci longitudinales) in filamenta moniliformia, pseudodichotoma nuda (i. e. nec capsulis nec vaginis obducta) concatenati. Arthrosporae macrosomae in apice filamentorum obvenientes. *B. xanthopyretica.* (Syn.) *Streptococcus xanthopyreticus* Trevisan. Filamentis undulato-flexuosis 0.6 to 0.8μ diam., longissimis. Hab. in organis variis in individuis febri flava laborantibus. *B. erysipeloidis* Trevisan.

Babesia: Starcovici, 1893.

Cent. f. Bakt., v. 14, 1893, p. 1. See also Flügge, Die Mikroorganismen, v. 2, 1895, p. 620. Included by Flügge and by Stiles among the Protozoa. Author renames *Haematococcus bovis* Babes and *H. ovis* Babes. Includes here also *Pyrosoma bigeminum*, Th. Smith. Starcovici places his genus between the bacteria and the Protozoa.

Bacillococcus: Frankland, 1890.

Philos. Trans. Roy. Soc. Lond., v. 181, 1890, p. 122, fig. 1. A "bacillus of nitrification" isolated from soil. Rods about 0.8μ long, and almost as broad, coccuslike. Single and in pairs, also in small, irregular groups. Nonmotile.

Bacillopsis: Petschenko, 1908.

Bull. Int. de l'Acad. d. Sci. de Cracovie. Math. et Nat. Cracovie, 1908, p. 359.

Type species (monotypy).—*B. stylopygae.* Found in the digestive tube of *Blatta orientalis* (*Stylopyga orientalis*). Length 10μ, by 2.5μ wide. A slightly curved rod, with one end slightly pointed, the other obtuse. Nucleus is present. Also highly refractive "corpuscules" in the transparent protoplasm, which are probably nutritive substances. Reproduction by a sort of budding, in which the very small daughter cell remains attached to the mother cell by a delicate filament until it has attained the size of mother cell. After this stage of active growth there is a stage in which filiform prolongations appear, and the "corpuscules" unite into 1 or 2, rarely 3 large round bodies. Vacuoles observed. In doubt as to position of organism, but does not think it belongs with the bacteria. (Has been included by other authors among the bacteria.)

Bacillus: Latreille, 1825.

Orthoptera. According to Agassiz: Nomencl. Zool. Index Univ., 1848, p. 122.

Bacillus: Cohn, 1872.[1]

Beitr. z. Biol. d. Pflanz., v. 1, H. 2, Breslau, 1872, p. 174. Straight threads, motile, cylindric, flexible, or rigid; multiplication by transverse division, the individuals often remaining together to form longer or shorter threads or chains. Endospores.

Types species (subsequent designation by many authors).—*B. subtilis* Syn. (Cohn) *Vibrio subtilis* Ehrenberg, and the ferment butyrique of Pasteur. Very thin threads, flexible, delicate; segmentation not readily observed. Single individuals 6μ long, often in pairs, also in threes, and in threads up to 132μ long.

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[1] See Stiles (Bull. No. 24, Hyg. Lab. U. S. Treas. Dept., Washington, Sept., 1905, p. 35) who regards *B. subtilis* as the type. Buchanan (J. Bact., v. 3, No. 1, p. 34) gives a very comprehensive review of the characters attributed to the genera *Bacillus* and *Bacterium* by the different authors. He states that the "type of *Bacillus* practically always accepted is *B. subtilis.*"

No nucleus present. Characteristic motility. "Dauerzellen oder Gonidien" may occur in threads. Includes here also *B. anthracis* (Davaine), and *B. ulna.*

Bacillus: (Cohn) emend. Hueppe, 1886.

Die Formen der Bakterien. F. Hueppe. Wiesbaden, 1886, pp. 142, 148. Rods in straight threads; endogenous spores without enlargement of the cell.

Bacillus: (Cohn) emend. Migula, 1894.

Die Syst. d. Bakt., v. 2, Jena, 1900, p. 515. Shorter or longer, rod-shaped to ovoid straight cells, often united into rather long threads, motile by means of wavy-bent flagella scattered over the whole body. Endospores are frequent. Motility occurs in most species only during a definite period of development.

Bacteriopsis: Trevisan, 1885.

Atti d. Accad. fisio-med.-statis. in Milano, ser. 4, v. 3, 1885, p. 103. Three stages of growth: 1. Bacilli. 2. Filaments. 3. Cocci. The bacilli (typical protoplasmic stage) are short, cylindrical or ellipsoidal, straight, of two forms: macrobacilli and microbacilli. Cytoplasm homogeneous. Filaments (transitory stage) result from division of the bacilli and cocci. The cocci (final stage) are derived from the microbacilli. No spores.

Species.—*B. rasmusseni* (the Leptothrix I of Rasmussen). Includes here also *Mycoderma aceti* Thomsen, *Bacterium pasteurianum* Hansen, *Micrococcus ureae* Cohn, 1872, *Vibrio synxanthus* Ehrenberg, *Panhistophyton ovatum* Lebert, etc.

Bacteridium: Davaine, 1866.

According to Dict. Encycl. sci. Méd., v. 8, Paris, 1876, pp. 21–28 (paper by Davaine).

In the reprint of this paper in L'Oeuvre de C. J. Davaine, Paris, 1889, p. 425, Davaine gives the date as 1866, but the date appearing on the volume containing the paper as above given is 1876. He published the name "Bactéridie" for the anthrax organism in 1863 (Mém. de Soc. d. Biol., 1863, v. 5, Sér. 3, p. 195). Smith (Bact. in Rel. Plant Dis., v. I, p. 158) gives the date 1868, as do many others. Filiform body, straight or bent, more or less distinctly articulated through imperfect spontaneous division. Not motile. The type species(according to many authors) he describes very fully under this genus description, but names it only in French.

Type species (species first named and studied by Davaine).—*Bactéridie charbonneuse.* Filaments straight, rigid, cylindrical, sometimes composed of 2, 3, rarely 4, segments, when they are inflected at obtuse angles. Very thin compared to their length, which is 0.01 mm. or 0.012 mm. for a single segment, up to 0.05 mm. for a filament. Causing anthrax in man, sheep, cattle, horses, rabbits, etc. He includes several species under this genus, and in one case—the "*Bactéridie du levain*"—he follows with the Latin name *B. fermenti.*

Bacteridium: Schroeter, 1872.

Beitr. z. Biol. d. Pflanz, v. 1, 1875, p. 126. Species: *B. prodigiosum* (Ehrenberg), and several other species of pigment-forming organisms. It is possible that he was following Davaine. Makes no mention of forming a new genus.

NOTE.—*Bactridium* has been ascribed to him by several bacteriologists (e. g., Smith, Bact. in Rel. to Plant Dis., v. 1, 1905, p. 158), but the name he used was *Bacteridium.*

Bacteridium: Sauss. Orthoptera, 1868. Scudder: Nomenclator Zool., Wash., D. C., 1882, p. 35.

Bacterium: Ehrenberg, 1828.

Symbolae Physicae. Animal. evertebrata. Decas Prima. Hemprich and Ehrenberg, Berlin, 1828, pp. 2 and 8, pl. 2, fig. 6.

Ehrenberg says in Die Infusionstierchen, etc., 1838, p. 57: Gegründet wurde die Gattung *Bacterium* im Jahre 1828 in der Abhandl, d. Berl. Akademie, 1829, p. 15, und in den Symbolae Physicae Hemprich u. Ehrenberg, 1828, mit drei species aus Afrika.

Bacterium, Novum Genus, Familia *Vibrioniorum*. Character Generis: Corpus polygastricum? anenterum? nudum, oblongum, fusiforme aut filiforme, rectum, monomorphum (contractione nunquam dilatatum), parum flexile (nec aperte undatum), transverse in multas partes sponte dividuum.

Type species.—*B. triloculare* nov. spec.: distincte triloculare s. triarticulatum, subfusiforme, hyalinum. Animalculum 1/200 linie longum, corpore tereti. Articuli s. septa interna divisionem instantem multiplicem transversam indicare bidentur. Mobile sed pigrum animalculum. In Oasi Iovis Hammonis Siwae observatum, praeterea nullibi. Bacterii Generis physiologia hucusque obscura, Cibo colorato ventriculos replere hae formae respuunt ideoque ad Polygastrica non nisi dubitanter et interim collocantur. In 1830 (Abhandl. d. Konig. Akad. d. Wissensch. zu Berlin, 1830–1832, pp. 38 and 69) he adds the following to his earlier description: Phytozoa: Classis I Polygastrica. A. Anentera. Ordo I Nuda. Family I Gymnica. Corpore non ciliato, oreciliato nudove (p. 37). Sectio II Vibrionia. Elongata, in se nunquam contracta. Subsection *c*: Corpore oblongo, fusiformi aut filiformi (tereti aut triquetro nex quadrangulo) aperte undatum non flexili nec spirali: Bacterium. nov. Gen. Haec genera, Oscillatories valde affinia, ore nutriri nondum vidi. He includes eleven species (p. 38) here: *Bacterium cylindric, Bact. deses, Bact. enchelys, Bact. fuscum, Bact. monas, Bact. punctum, Bact. termo, Bact. tremulans, Bact. simplex, Bact. scintillans*, and *Bact. triloculare.*

In Die Infusionsthierchen, p. 74, the genus *Bacterium* is described as follows: Char.: Animal e familia Vibrioniorum, divisione spontanea in catanam filiformem rigidulam abiens.

On p. 74 he also states as to the motlity of the genus: "Ich habe auch bei der stärkesten Art und Gattung *Bacterium* ein Bewegungsorgan als einfachen wirbelnden Rüssel erkant."

For a further characterization see Abhandl. d. König. Akad. d. Wissensch. z. Berlin, 1831–32, pp. 38 and 69, and Die Infusionsthierchen als vollkommene Organismen, Leipzig, Verlag von Leopold Voss, 1838, 548 pp., folio, Pl. V.

Bacterium: (Ehrenberg) emend. Cohn, 1872.

Beit. f. Biol. d. Pflanz., Cohn. v. I Heft 2, Breslau, 1872, pp. 146, 167. Cells short cylindrical or elliptical; Multiplication by cross division. Often in pairs, occasionally in fours. No chains or threads. Zoogloeae.

Type species (inclusion).—*Bact. termo* (Müller, 1773, Ehrenberg, 1830, Dujardin, 1841, Vignal) Cohn. Short cylindrical, oblong cells, with a relatively thick membrane. Measure usually about 1.5μ long, and only half or a third as wide. States that it is the "Ferment der Fäulniss." Motile. *Bact. lineola* (*Vibrio lineola* Ehrenberg ex parte *Vibrio tremulans* Ehrenberg. *Bacterium triloculare* Ehrenberg. *Vibrio lincola* Dujardin. *Vibrio lincola* Müller.)

Bacterium: (Ehrenberg) emend. Migula, 1894. Reference as for *Planococcus;* p. 236. Also Syst. d. Bakt., v. 2, Jena, 1900, p. 279.

Shorter or longer cylindrical cells, sometimes forming threads, without flagella. Endospores.

Bacterium: (Ehrenberg) emend. Zopf, 1883.
Rods and cocci without spores. Die Spaltpilze. W. Zopf, Breslau, 1883–5.

Bacterium: (Ehrenberg, Cohn) emend. Smith, 1905.
Bacteria in Rel. to Plant Dis., v. 1, Carnegie Institution, Washington, D. C., 1905, p. 171. The one-flagellate, green-fluorescent schizomycetes, capable of growing in Cohn's nutrient solution. To these should be added all the morphologically similar, nonfluorescent and yellow species. Syn. (Smith) *Pseudomonas* Migula. Based on the species *Bacterium termo* Cohn.

Bacterium: (Ehrenberg) emended Jensen, 1909.
Cent. f. Bakt., Abt. 2, v. 22, 1908–9, p. 336. "Wir wollen die artenreiche Gattung der Coli-Bakterien einfach *Bacterium* nennen."

Bacterium: (Ehrenberg, Jensen) emended Winslow, Broadhurst, Buchanan, Krumwiede, Rogers and G. H. Smith, 1917.
J. Bact. v. 2, no. 5, Baltimore, 1917, p. 560. See also Buchanan, J. Bact., v. 3, no. 1, p. 53. Motile or nonmotile rods staining evenly. Easily cultivable. Animal pathogens or saprophytes. Often chromogenic. Many forms actively decompose carbohydrates.
Type species (original designation).—*Bacterium coli* Escherich.

Bacterius: Kendall, 1902.
Public Health Reports and Papers for 1902, v. 28, Columbus, Ohio, 1903, p. 484. See also Proc. Am. Bact. Soc., Chicago, Dec., 1901, Jan., 1902. Cells elongated, cylindrical; longer diameter always greater than the shorter; cells elongated before division; motile, flagellation unknown. (Author states that this group will disappear as knowledge of flagellation becomes more complete.)

Bactrella: Morren, 1830.
Messager des Sciences de Gand, v. 6, 1830. See also Bull. des. Sci. Natur. de Ferussac, v. 27, 1831, p. 203. He places the "Vibrions lamellinaires" in this genus. Corpus simplex, elongatum, cylindricum vel utroque extremo obtusum, vel anticè tenuiter, posticè e contra admodum attenuatum, undique clausum, vel partim, vel omnino mobile. *Species.*—*B. undula* (*Vibrio undula* Müller). *B. bacillus* (*V. bacillus* Müller). *B. filum* n. sp.

Bactridium: Fischer, A., 1895.
Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 144. Cells straight, rod-like or short ellipsoidal. Division in but 1 direction. Motile by means of diffuse flagella. Endospores in rods not swollen.
B. subtile (Ehrenberg, Cohn, 1872), *B. megaterium* (De Bary), etc.

Bactridium: Kunze, 1817 (for fungi).
Bactridium: Salisbury, 1839 (section under *Erica*).
Bactridium: Le Conte, 1861 (Zool.).

Bactrillius: Kendall, 1902.
Public Health Reports and Papers for 1902, v. 28, Columbus, Ohio, 1903, p. 484. See also Proc. Am. Bact. Soc., Chicago, Dec., 1901, Jan., 1902. Cells elongated, cylindrical; longer diameter always greater than shorter diameter, cells elongated before division. Monotrichic flagellation.

Bactrillum: Fischer, A., 1895.
Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 142. As under *Bactridium* Fischer, but motile by polar flagella. Species: *Bactrillum pseudo-termo* (*Bacterium termo* Aut. pr. p., *Bacterium termo* (Dujardin), Cohn 1872. Cells not cylindrical but clearly ellipsoidal, and usually pointed toward the flagella-bearing end, so that they are somewhat egg-shaped. In pairs often, rarely in chains. No spores. *B. fluorescens longum* (*B. fluorescens longus* Zimmerman).

Bactrinium: Fischer, 1895.
Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 141. As under *Bactridium* Fischer, except that the cells are motile by means of a single polar flagellum.
Species.—*B. pyocyaneus* Löffler.

Bactrinius: Kendall, 1902.
Public Health Reports and Papers for 1902, v. 28, Columbus, Ohio, 1903, p. 484. See also Proc. Am. Bact. Soc., Chicago, Dec., 1901, Jan., 1902. Cells elongated, cylindrical, longer diameter always greater than shorter; cells elongated before division; flagellation lophotrophic.

Bakterium: Variant of *Bacterium.* Many German authors.

Beggiatoa: Trevisan, 1842.
Prospetto della Flora Euganea Trevisan. Padova, 1842, p. 56. Thallus e filis muco obvolutis, liberis, oscillantibus, simplicibus, elasticis, rigidis, arachnoides, punctis, asterisciformibus, primum in fascias dispositis dein inordinatis, notatis, conflatus.
Species—*B. leptomitiformis* (Menenghini). B. filis extremitatibus valde attenuatis, subulatis, apicibus acutissimis. *B. punctata* differt filis extremitatibus conformibus, apicibus obtusis. Migula (Syst. d. Bakt., v. 2, 1900, p. 1041) states that this latter species is synonymous with *Beggiatoa alba* (Vaucher) Trevisan. Buchanan (J. Bact., v. 3, No. 5, 1918, p. 464) designates the type as *B. alba* Vaucher, Trevisan.

Betabacterium: Orla-Jensen, 1919.
Mém. de l'Acad. Roy. d. Sci. et d. Lettres de Danemark, Copenhagen, 1919. Sec. d. Sci., 8 me. sér., v. 5, no. 2, pp. 81–196. Lactic acid bacteria. Rods; gram-positive; nonmotile; no spores.

Betacoccus: Orla-Jensen, 1919.
Reference same as above. Lactic acid bacteria. Synonymous (Winslow in Abstracts of Bact., v. 4, 1920, p. 102) with *Leuconostoc* van Tieghem.

Billetia: Trevisan, 1889.
Gen. e Spec. delle Batteriacee, 1889, p. 11. According to De Toni and Trevisan: Sacc. Syllog. Fungorum, v. 8, 1889, p. 931. The genus is here placed under *Kurthia* Trevisan. The type species was *Billetia laminariae* (Billet).

Bollingera: Trevisan, 1889.
Gen. e Spec. delle Batt., 1889, p. 26. According to De Toni and Trevisan, Sacc. Syllog. Fung., v. 8, 1889, p. 1039 Cocci globosi v. divisionis tempore globoso-ovoideis, cystidibus specialibus destituti, numerosissimis, in muco matriceli nidulantes, segregati, in familias globosas, magnas, singulas cystidibus universalibus amplis, crassis, lamellosis, summe firmis, cartilagineis involutas, inordinate consociati. Globae globosae v. ovoideae vel piriformes, omni aetate intus solidae, in acervos permagnos solidissimos, ruborum fructus externam faciem quodammodo simulantes, densissime cumulatae. Coccorum divisio in tres directiones.

Type species (monotypy).—*B. equi.* Coccis 1 to 1.5μ diameter geminatis vel subbotryoideo congestis. Hab. in pulmonibus equorum morbo "mycodesmoideo" aegrotorum, humani efficit. Syn. (De Toni and Trevisan) *Zoogloea pulmonis equi Bollinger* 1870, *Discomyces equi* Rivolta, *Micrococcus ascoformans* Johne 1885, *M. botryogenes* Rabe, 1886.

Borrelia: Swellengrebel, 1907.

Ann. de l'Inst. Past., v. 21, Paris, 1907, p. 582. Genus is placed under the *Spirillaceae* Migula, and subfamily *Spirochaetaceae* Swellengrebel. Flexible cells with peritrichiate flagella.

Type species (monotypy).—*Sp. gallinarum.*

Botryococcus: Kitt, 1888.

Centralbl. f. Bakt. u. Parasit. Jahrg. 2, v. 3, No. 8, Jena, 1888, p. 246. See also Bacterienk. u. Path. Mikrosk. f. Thierärzte u. Stud. d. Thierm. v. Th. Kitt, 4th Umgearb. Auf., Vienna, 1903, p. 477, 2 figs. Also 5th Aufl., 1908, p. 497. Small granules of the character of micrococci, surrounded by a homogeneous, round or disk-shaped capsule. Single masses of this sort measure 5 to 100μ in diam., and present a glistening, sharp outline. These encapsulated masses may be arranged in botryoidal or grapelike and disklike clusters. The individual cells of these encapsulated bodies measure about 1μ in diam.

Type species (monotypy).—*Botryococcus ascoformans* (Johne, Bollinger). Syn. (Kitt) : *Zoogloeae pulmonis equi* Bollinger, 1869; *Discomyces equi* Rivolta; *Botryomyces ascoformans* (Johne) Bollinger, 1887; *Micrococcus botryogenes* Rabe; Micrococcus *ascoformans* Johne. Causing fibrous tumors in horses.

Botryococcus: Kützing, 1849.

Spec. Alg. Kützing. Leipzig, 1849, p. 892. An alga in same group with Polycoccus and Palmella, with the type species as *B. braunii.*

Botryomyces: Bollinger, 1887.

Deut. Zeitschr. f. Thierm. u. Vergl. Path., v. 13, Hefts 2 and 3, 1887, p. 176. See also idem., v. 14, 1888–89, and Virchow's Arch., v. 49, 1870, p. 583. Similar macroscopically to *Actinomyces.* Under strong magnification the grapelike colonies consist of conglomerate, roundish, varying-sized broomlike groups or heaps of micrococci (4 to 4.5μ). Each colony (150 to 250μ) is surrounded by a homogeneous capsulelike membrane, and in this respect resembles the *Ascococcus* of Billroth. Ray-funguslike, fibrous masses produced at times in host.

Type species (monotypy).—*B. ascoformans* (Johne). [Bollinger's earlier name was *Zoogloea pulmonis equi.*] Syn. (Bollinger) : *Micrococcus botryogenes* Rabe, 1886; *M. ascoformans* Johne, 1885; *Discomyces equi* Rivolta and Micellone, 1879.

Botulobacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 343. Peritrichiate rods, anaerobic, forming an ectotoxin acting on the central nervous system.

Includes *Bacillus botulinus* van Ermengem here.

Brachybacterium: Troili-Peterson, 1903.

Centralbl. f. Bakt., Abt. 2 v. 11, 1903–4, p. 138. Short rods, oval or ellipsoidal, whose length does not exceed twice the breadth.

Species.—*B. apiculatum* n. sp.: Breadth of the short rods 0.8μ, and length sometimes twice the width. Ends usually pointed. Often in pairs, rarely in short chains. Found in Swiss cheese. He also places here *Bacterium lactis acidi* Leichmann and *Bact. lactis* Lister, and 6 others which he describes under numbers.

Butyl-Bacillus: Fitz, 1878.

Ber. d. deutsch. chem. Gesellsch. v. 9, 1878, p. 48. A bacillus forming normal butyl alcohol from glycerin.

Butyribacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9,, p. 342. Peritrichiate, spore-forming, obligate anaerobes—the butyric acid group of bacilli.

Species.—Places *Bacillus chauvoei* (Arloing, 1887) here.

Byolysis: Salisbury, 1868.[1]

Microscopic examination of the blood; and vegetations found in variola, vaccinia, and typhoid fever. J. H. Salisbury, N. Y., 1868, 65 pp.

Byolysis typhoides Salisbury.—A minute "algoid vegetation developing in and on the human body in typhoid fever." Flourishes with great luxuriance in the "agminated and solitary glandules of Peyer." The spores multiply by duplicative segmentation, and develop rapidly on and in the cells of the epidermic and mucous surfaces. Spores frequently found in the colorless corpuscules, destroying their contents and dilating their walls, so that the cells are often from 2 to 4 times normal size.

Calymmatobacterium: Beaurefaire-Arago and Vianna, 1913 (=Kalymmabacterium).

Memor. do Instit. Oswaldo Cruz, v. 5, Rio de Janeiro, 1913, p. 221.

Type species (monotypy).—*C. granulomatis.* Encapsulated coccus 0.2 to 0.3μ in diam., or rods with rounded ends of 0.5 to 2μ in length; also encapsulated. Prior to division the rod presents a median constriction, appearing as a diplococcus. Found in granulomata.

Carboxydomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 311. Nonmotile, short rods, capable of oxidizing carbon monoxide.

Type species (monotypy).—*Bacillus oligocarbophilus* Beijerinck and Van Delden.

Carphococcus: Hohl, 1902.

Centralbl. f. Bakt., Abt. 2, v. 9, 1902, p. 338. Variant of *Karphococcus* Hohl.

Carteria: (Musgrave and Clegg, 1908) emended Merrill and Wade, 1919.

The Philippine J. of Sci., v. 14, no. 1, Manila, 1919, p. 64. Corrected spelling of "*Carterii*" Musgrave and Clegg.

Carterii: Musgrave and Clegg, 1908.

The Philip. J. of Sci., v. 3, Med. Sci. B, Manila, 1908, p. 470. Musgrave and Clegg adopt the name *Streptothrix* for the group of branching, filamentous microorganisms known as *Streptothrix*, *Actinomyces* or *Nocardia*, causing a disease in man and animals which they designate "streptothricosis." They state, however: "In making this decision we are fully aware of the rights of those who favor *Actinomyces* or *Nocardia*, and under the circumstances are tempted to introduce a new name (*Carterii*) for the genus, together with a full and complete definition." See *Streptothrix* (Cohn) emended Musgrave and Clegg.

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[1] Several of the figures on the plate illustrating this genus resemble streptococci. Salisbury refers to a filamentous stage in this genus only in the figure descriptions where he states that the more mature stage is filamentous. Marchand (Bot. Crypt., t. 1, 1883, p. 471), thinks this genus is synonymous with *Crypta* Salisbury.

Caryobacterium: Mori, 1913.

Ann. d. Staz. Sperim. per le malattie infettive d. bestiame, v. 1, 1911–1913, p. 302, 1 pl.

Type species (monotypy).—*C. equi.* Causing "Brustseuche" in horses. Cocco-bacillary or bacillary form, either straight or slightly curved; single or united; 2.5μ by 0.5μ; motile. No capsule. A nucleus demonstrated through cultivation on a maltose-mannit-peptone medium, staining by methylene blue, fuchsin, etc.

Caseobacterium: Jensen, 1909.

Cent. f. Bakt., Abt. 2, v. 22, 1908–9, pp. 336 and 337. The lactic acid group of bacteria. Attack casein, but not by means of a proteolytic enzyme; author thinks it may be "ein intracellular oder postmortaler Vorgang."

Cellulobacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 342. Cellulose-fermenting group of peritrichiate rods. Obligate anaerobes.

Type species (monotypy.)—*C. methanigenes.*

Cenomesia: De Toni and Trevisan, 1889.

Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1039. Cocci globosi vel divisionis tempore globoso-ovoidei, modice numerosi, in muco matricali nidulantes, segregati, in familias globosas parvas singulas cystidibus universalibus ampliusculis, crassiusculis homogeneis, nonmalellosis, firmis, gelatinosis involutas, consociati. Familiae e occis ad peripheriam cumulatis compositae, demum intus medio inanes. Cystides speciales nullae. Coccorum divisio, initio generationum serierum, in duas directiones.

Species.—*C. albida.* Coccis achrois, granulis sulphuris parce onustis. Hab. in consortio Leptotrichiae iveae in aquis sulphuratis pagi "Stabio" Helvetiae Ticinensis (Trevisan). *C. lilacina.* Coccis dilute violaceis, granulis sulphuris abundanter onustis. Hab. in aquis sulphuratis domi cultis (Winogradsky).

Chaos: Linnaeus, 1773–1776.

Vollständiges Natursystem nach der 12 lateinischen Ausgabe und Nach Anleitung des holländischen Houttuni'schen Werks, etc. Nürnberg, 1773–1776. (According to Löffler: Vorles. u. die geschict. Ent. der Lehre von den Bacterien, Leipzig, 1887, p. 9.) Into this one genus Linnaeus placed "die ganze Welt der kleinsten Lebewesen." Ehrenberg (Die Infusionsthierchen 1838, p. 36) says that he separated only "Vorticellen" and a few slightly larger forms, placing all others under his "einfaches," calling them *Chaos infusorium.* Later, he included 5 species under *Chaos: C. fungorum, C. infusorium, C. protheus* [Syn. (Stiles) *Volvox chaos*, a protozoon], *C. redivivum* (a nematode), and *C. ustilago.* Dr. Stiles states in letter of May 23, 1919, that the type is *C. protheus*, synonymous with *Volvox chaos.* Goze (Naturgesch. d. Einigew. 1782, p. 429) used the term for some of the larger infusors. Oken in 1815 (according to Ehrenberg) named *Chaos organicum* "nur noch die Gattung Monas." Bory de St. Vincent (Dict. Class. d' Hist. Nat., 1823) put under this genus "Priestley's green matter"—the green slime of stagnant water, spelling it *Cahos.* Gleichen (Dissertation sur la genération des animalcules spermatique et ceux d'infusoires. Paris, An. VII, 1799, p. 182, 187, etc.) applied this term to "petits globules joints ensemble, se roulant pêle-mêle" and to "parties indiscernibles, se roulant profondement dans l'eau."

Chatinella: Roze, 1898.

Bull. Soc. Mycol. de France, 14, Paris, 1898, p. 69.

Type species (monotypy).—*C. scissipara.* Saprophyte, found in decayed plant tissues. Spherical bodies, rarely ovoidal, consisting of a colorless protoplasm containing granules, and sometimes what appears to be a nucleus. Not motile. Reproduction by fission. A resting stage observed in which the spherules are surrounded by a membrane reaching a thickness of 3μ. This membrane gradually dissolves when division occurs and the active vegetative stage is reached. The noncapsulated cells measure from 21 to 27μ in diameter. (Roze is not certain as to its position, but thinks it belongs among the Schizomycetes.)

Chlamydatomus: Trevisan, 1879.

Rend. Reale Ist. Lombardo, ser. 2, v. 12, 1879, p. 137. See Saccardo, Sylloge Fungorum 8, 1889, p. 1042, for species. Cellulae globosae, divisionis tempore ovoideae, inordinate in colonias conglobatas pluristratas densisime consociatae, 1 to 4 tegumentis propriis gelatinosis crassiusculis confluentibus obvolutae. Coloniae tegumento communi destitutae.

Species.—*C. beigelii.* Syn. (Trevisan) *Sclerotium beigelianum* Hallier (Parasitol. Unversuch. p. 75, 1868); *Pleurococcus beigelii* Küchenmeister and Rabenhorst; *C. cellaris* [*Hyalococcus cellaris* (Hansgirg) Schroeter.]

Chlamydothrix: Migula, 1900.

System d. Bakt. Migula. v. 2, Jena, 1900, p. 1030. Cells cylindrical, nonmotile, arranged in unbranched threads surrounded by a sheath of varying thickness. Septation of threads often demonstrable only after the use of reagents. Reproduction by means of round or ovoid, nonmotile conidia, which arise directly from the vegetative cells. Syn. (Migula) *Streptothrix* (Cohn) Migula, *Leptothrix* (Kützing) exp., *Gallionella* Ehrenberg exp.

Type species.—*C. ochracea* (Kützing). He also places here *C. ferruginea* (Ehrenberg), *C. hyalina* Migula, *C. epiphytica* Migula, *C. fluitans* Migula.

Chlorobacterium: Guillebeau, 1890.

Landw. Jahrb. d. Schweiz, v. 4, 1890, pp. 32 and 41. Rods 3μ by 1μ, very motile. Rapid liquefaction of gelatin. Growth on potato rapid and after 2 days green. Green also on agar-agar. Aerobic and anaerobic.

Type species (monotypy).—*C. lactis* n. sp. Found only once in an inflamed udder.

Chlorobium: Nadson, 1906.

Bul. du Jard. Impér. Bot. de St. Pétersburg, v. 5, 1905, p. 190. Résumé in German, p. 194. See also idem, v. 12, 1912, pp. 55 and 83. A green, chlorophyll containing organism, which author thinks belongs with the bacteria or close to *Stichococcus bacillaris.*

Type species (monotypy).—*C. limicola.* Cocci 0.4 to 0.5μ in diam., round or elliptical, or short rods. Non-motile. Multiplication by cross division. Long chains common in both the round and rod forms. Involution and apochlorotic forms occur.

Chlorochromatium: Lauterborn, 1906.

Allg. bot. Zeitschr., v. 12, No. 12, Karlsruhe, 1906, p. 196. See also idem, vols. 19–20, 1913, p. 98.

Type species (monotypy).—*C. aggregatum* n. g., n sp. Elliptical to spindle-shaped cells, ends slightly blunt. Color greenish yellow, margins deeper than center. Capsule. Motile. Measures 0.009 to 0.012 mm. by 0.005 to 0.007 mm. Multiplication by transverse fission. These bodies surround mantle-like, an axillary colorless, gelatinous (?), "hohlraum." Found in decayed pond weeds. In 1913 Lauterborn places the organism under his newly formed family: Chlorobakteriaceae.

Chloronium: Buder, 1914.

Ber. d. deutsch. Bot. Gesellsch., v. 31, Berlin, 1913–14, Generalvers. Heft, p. (80). Pl. 24.

Type species (monotypy).—*C. mirabile.* Found in water in the Leipzig Botanic Garden. A cylindrical rod 0.7 to 1μ by 1 to 2μ with rounded ends, sometimes slightly curved, green, united into a zoogloeal mass, in the center of which is a colorless, spindle-shaped, 1-polar flagellate organism. The latter measures 2 to 2.5 by 5μ. Multiplication by transverse division. The "peripheral component" is sometimes of coccus form also green of 0.75μ diameter. Usually about 10 to 30 arranged in rather definite order about the colorless central organism. Perfiliev (J. Mic. Biol. v. 1, 1914, p. 223) says that the peripheral forms described here are identical with *Chlorochromatium aggregatum* Lauterborn. Buder is in doubt as to the systematic position of *Chloronium.* Perfiliev describes the "central organism" of Buder's *Chloronium* as *Cylindrogloea*, q. v.

Chondromyces: Berkeley and Curtis, 1857.

Berk. Introd. Crypt. Bot., 1857, p. 313, fig. 70. (Merely named here, no description.) See Grevillea, v. 3, 1874, p. 64. Stipes e floccis compactus ramosus induratus; sporae apicales.

Type species (monotypy).—*C. crocatus* Berkeley and Curtis. On decayed melons. [Car. Inf. 1335.] Stem closely compacted, orange, subcartilaginous, branched, the branches more or less divaricate, nodular at the apex; spores elongate-ovate, with a very short pedicel. Legend beneath figure in first reference states that specimen was from a decayed gourd from South Carolina. Thaxter says it belongs under the *Myxobacteriaceae.* See Bot. Gaz., v. 17, 1892, p. 401, and v. 23, 1897.)

Chromatium: Perty, 1852.

Zur Kenntniss Kleinster Lebensformen. Perty. Bern, 1852, p. 174. Cells small, cylindrical, content granular and colored red, brown, violet or green. "Ein bewegunsfaden am vorderende?" Multiplies by division.

Type species (subsequent designation by Buchanan, J. Bact., v. 3, No. 5, 1918, p. 470, and other authors.).—*C. okenii* (Ehrenberg). Cells with broad, rounded ends, often slightly bent. Includes here also *C. weissii.* Color light violet or brown. Ends rounded, cell granules sharply contoured in older individuals. *C. violascens.* Cells spherical or elliptical, very light violet in color, 1/1200 to 1/900 inch in size.

Chromobacillus: Hansgirg, 1888.

Oesterreich. Bot. Zeitschr., v. 38, 1888, p. 265. Single cells appear almost colorless, the zoogloeae rose to blood red, blue, etc. The only species he discusses here is *B. sanguineus* Schröter, which probably represents the type.

Chromobacterium: (Bergonzini) emended Buchanan, 1918.

J. Bact., v. 3, No. 1, Baltimore, 1918, p. 52. Rod-shaped bacteria with spores; aerobic; producing a violet pigment soluble in alcohol but not in chloroform; motile or nonmotile; gram-staining variable.

Type species (original designation).—*C. violaceum* Bergonzini.

Chromobeggiatoa: Hansgirg, 1888.

Oesterreich Bot. Zietschr., v. 38, 1888, p. 264. A subgenus of *Beggiatoa.* Threads of rose to cherry red, rose or blue red, or violet to violet brown.

Type species (monotypy).—*Beggiatoa roseopersicina* Zopf.

Cladochytrium (Nowakowski, 1876) Vuillemin, 1888.

Ann. de la Sci. Agron. Franc. et Etrangère, 2 Ann. v. 1, 1888, p. 1983. A fungus genus belonging to the Chytridinaceae. *C. tuberculorum* Vuillemin. Renames *Schinzia leguminosarum* Frank. Syn. (Buchanan in J. Bact., v. 3, no. 1, 1918, p. 46), *Rhizobium* Frank.

Cladomyces: Engler, 1883.

Vierter Bericht der Commission zur Wissenschaftlichen Untersuchung d. deutschen Meere, in Kiel, 1883, p. 187. Filus gelatinosis juvenculis simplicibus, adultis ramosis ramulis, acutatis apice crescentibus, cellulis subovalibus, egranulosis.

Type species.—*C. mobiusii.*

Cladothrix: Nuttall, 1849.

Cited by Buchanan in J. Bact., v. 3, no. 3, Baltimore, 1918, p. 302, which use he claims invalidates *Cladothrix* Cohn.

Cladothrix[1]**:** Cohn, 1873.

Ber. u. Thätig. d. bot. Sect. d. Schles. Gesellsch., 1873, pp. 42–45. See also Beitr. z. Biol. d. Pflanz., v. 1, Heft 3, Breslau, 1870–1875, pp. 185 and 204. Pl. 5, fig. 8. Filamenta leptotrichoidea tenerrima achroa non articulata vel subundulata pseudodichotoma.

Type species (monotypy).—*C. dichotoma.* Colorless threads. Found in foul water.

Cladothrix: (Cohn) em. De Toni and Trevisan, 1889.

Saccardo's Sylloge Fungorum, v. 8, 1889, p. 927. Filamenta basi ab apice superiore distincta, vagina crassa obducta cylindrica, aetate provecta a basi ad apicem magis magisque incrassata, articulata, pseudoramosa. Arthrosporae binae in singulis microbaculis ellipsoideis ortae.

Clathrococcus: Schmidt and Weis, 1902.

Die Bakterien. Schmidt and Weis. Jena, 1902, pp. 8, 9, 21.

Type species (monotypy).—*C. roseo-persicinus* (Cohn). Belonging to the Sulphur bacteria. A flagellated coccus, cells dividing at first in 3 directions, later only in 2.

Clathrocystis: Henfrey, 1856.

Quart. J. Mic. Sci., London, v. 4, 1856, p. 53. Henfrey described this genus as a yellowish opaque green alga, found in fresh-water pools. Frond a microscopic gelatinous body at first solid, then saccate, ultimately clathrate, composed of a colorless matrix in which are embedded numerous minute gonidia, which multiply by division within the frond, as it increases in size. No zoospores or resting spores observed.

Type species (monotypy).—*C. aeruginosa* (Pl. V, 28–36). Fronds floating in vast strata upon fresh-water pools, forming a bright green scum, finely granular. Gonidia with a distinct membrane, and about 1/8000 inch in diameter. Fully developed fronds 1/50 to 1/15 inch in diameter. Syn. (Henfrey) *Microhaloa aeruginosa* Kützing. Cohn (Ber. u. die That. d. bot. Sec. Schl. Gesell., 1874, p. 36, and Beitr. z. Biol, v. 1, Heft 3, 1875, p. 157) placed a species under Henfrey's genus, e. g., *C. roseo-persicina*, which he states he found on leaves and other plant parts. Cells 2.5μ diameter. First described by Kützing as *Microhaloa rosea* (Linnea, v. 8, p. 341), later by same author as *Protococcus* (Spec. Alg., p. 196), and finally by Rabenhorst as *Pleurococcus roseo-persicinus.* Described (according to Cohn) by Ray Lankester in 1873 (Quart. J. Mic. Sci., v. 13, p. 408) as *Bacterium rubescens.* Migula (Syst. d. Bakt., v. 2, 1900, p. 1043) says Cohn's species is synonymous with *Lamprocystis rosco-persicina* (Kützing) Schröter.

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[1] See footnote under *Leptothrix.*

Clitridium: Billet, 1890.

Bull. Sci. France et Belg., v. 21, sér. 3, v. 3, 1890, p. 54. Bacterium of average length in the form of a biscuit, "c'est-à-dire en train de se segmenter." (Possibly refers to a division stage—merely states the "Clitridium des auteurs," without any further reference.)

Clonothrix[1]**:** Schorler, 1904.

Centralbl. f. Bakt., Abt. 2, v. 12, 1904, p. 689. One of the iron bacteria closely related to *Crenothrix* and *Cladothrix.* Threads dichotomous or irregularly branched, attached at one end, the free end somewhat thinner. Sheath always present containing either iron oxyhydrate or magnesium oxyhydrate. Cells cylindric to flat discoidal. Multiplication through small, nonmotile conidia of spherical form.

Type species (monotypy).—*Cl. fusca* n. sp. Threads 5 to 7μ thick at base, narrowing off to 2μ at tip. Old segments covered with metal attain a thickness of 24μ. Color varies from colorless to yellow brown and dark brown.

Clostridium: Trécul, 1865.

Compt. rend. Acad. de sci., Paris, v. 61, 1865, p. 435. Describes it as a subgenus under his *Amylobacter.* An "amyliferous plantule," spindle-shaped form. Found in decaying flowering plant cells.

Clostridium: (Trécul) Prazmowski, 1879.

Bot. Zeit., 1879, p. 414. See also Untersuch. über die Entwicklungsgeschichte und Fermentwirkung einiger Bacterien-Arten. Prazmowski, Leipzig, 1880, p. 23. "Um die Synonymik der Bacterien mit einem neuen Worte zu bereichern, habe ich den von Trécul für ein Habitusform des Buttersäurefermeuts zuerst angewendeten Namen *Clostridium* zur Bezeichnung meiner Gattung gewählt."

Species.—*C. butyricum* Prazmowski. Syn. (Prazmowski) *Vibrion septique* of Pasteur; *Amylobacter, Clostridium, Urocephalum,* Trécul; *B. amylobacter* van Tieghem; *Bact. navicula* Reinke and Berthold. A rod 1 by 3 to 10μ; occurs in threads also; obligatory anaerobe; actively motile; at sporulation the rods swell to a width of 1.8 to 2.6μ; spores 1.2 to 2.5μ in diameter. In solutions of starch, dextrin, sugar (kind not stated) produces hydrogen, carbon dioxide, and much butyric acid. *C. polymyxa* Prazmowski; rodlike cells when young; when older, spindle-shaped, or ellipsoidal, and in those rods showing thickening spores arise, which in size and form are very similar to *C. butyricum.*

Clostrillum: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin., 1895, p. 144. Cells straight, rod like, or short ellipsoidal. Division in but one direction. Motile by means of tufts of polar flagella. Endospores in spindle-shaped rods.

Clostrinium: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 142. Cells straight, rodlike, or short ellipsoidal. Division in but one direction. Motile by means of a single polar flagellum. Endospores in spindle-shaped rods.

Clostrydium: Migula, 1900 (and others in literature).

Die Syst. d. Bakt. v. 2, 1900, p. 1061. Variant of *Clostridium* (Trécul) Prazmowski.

Coccobacillus: Gamaleïa, 1888.

Cent. f. Bact., v. 4, 1888, p. 167.

Type species (monotypy).—*C. avicidus.* "Huhncholerabakterien." Droplike growth on gelatin, white growth on agar. [Morphology not given.]

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[1] See footnote under *Leptothrix.*

Coccobacteria. Billroth, 1874.

Untersuchungen über die Vegetationsformen von Coccobacteria septica. Berlin, 1874, p. 1, and following.

[NOTE.—Billroth used this name in an inclusive sense, not in a restricted, generic meaning. This is true also of all the names of which he is the author. Apparently he was working with mixed cultures, which represent the various "forms" of his *Coccobacteria septica.*] A sort of plant, which consists in part of cocci, and in part of rod-shaped bacteria, which differ very greatly in size. Both forms are transformed readily one into the other. However, the vegetative form is rather constant, but after a long time the coccos, through stretching and cross constriction, give rise again to the rod-shaped form. In this process of multiplication both vegetative forms secrete a gelatinous sheath (glia); the multiplication occurs first in the upper surface so that thin, membraneous plates of cocci or bacteria arise (*Petalococcos* and *Petalobacteria*); at a certain depth in the liquid, flocculent, cloudy forms of *Gliacoccos* occur. The coccos forms can enlarge greatly and through progressive division give rise again to smaller coccos forms held within a membrane (gliakapsel) which surrounds the whole: *Ascococcos.* In a similar way the bacteria can also give rise to *Ascococcos.* If division is in but one direction and the coccos or bacteria are held together by the gelatinous membrane, then coccos chains (Streptococcos) and bacteria chains (Streptobacteria) are formed. The coccos, streptococcos bacteria, and streptobacteria all show in certain periods of their development (if they are not surrounded by too dense a gelatinous membrane, and are not too large) a sort of sluggish motion.

Cocco-Bacterium: Rivolta, 1887.

L'Allevatore, No. 1, May, 1887. According to Gironale di Anat. Fis. e Pat. degli Animali, Anno 20, Fasc. 1, 1888, p. 3.

Type species (monotypy).—*C. felis.* Motile "cocco bacteria" usually occurring in twos or threes, very closely united. Appear at times almost like micrococci. Vary in length from 0.00142 to 0.00285 mm. Author thinks it is the cause of infectious pleurisy of cats and dogs.

Coccobacterium: Schmidt and Weis, 1902.

Die Bakterien, Schmidt and Weis. Jena, 1902, p. 10. Short, plump rod-shaped cells, only slightly different from *Micrococcus.*

Type species (original designation).—*B. prodigiosus.*

Coccoglia: Billroth, 1874.

See reference under *Coccobacteria.* Throughout this publication Billroth uses this term interchangeably with *Gliacoccos.*

Coccos: Billroth, 1874.

Untersuch. über die Vegetationsformen von *Coccobacteria septica.* Berlin, 1874, p. 4. "The smallest constituent parts of the delicate plants found especially in spoiled liquids." Small, round or oval little bodies. They possess a sort of oscillatory motion scarcely to be distinguished from molecular motion.

Coccothrix: Lutz, 1886.

Dermatol. Studien harausgeg. v. Unna, Heft 1, Hamburg and Leipzig, 1886, p. 98, 1 fig. Small, round, coccus-like cells. Division in but one direction. Single or in series. Capsulated. Sometimes oval and double-contoured. He includes here *B. tuberculosis* Koch, the "lepra bacillus," and *B. malariae* Klebs and Tomassi. On p. 10, Heft 4, 1877, of above citation, Unna gives *Coccothrix leprae* Lutz.

Coccus: Cohn, 1875.

Beitr. z. Biol. d. Pflanz., v. 1, Heft, 3, Breslau, 1875, p. 147. Changed the spelling of Billroth's "Coccos," using the Latin ending.

Coccus: Used in the generic sense by the following and many others:

C. aquatilis Nissen, 1889. Zeitschr. f. Hyg., v. 6, Leipzig, 1889, p. 487.
C. cumulus minor: Miller, Microorg. d. Mundhöhle, 1892, p. 68.

Coccus: Gotschlich, 1912.

Handbuch d. Path. Org., Kolle and Wasserman, v. 1, 1912, p. 37. Bacteria always spherical.

Cocobacterium: Klinger, 1912.

Centralbl. f. Bakt., Abt. 1, v. 62, 1912, p. 186.

Type species (monotypy).—*C. mucosum anaërobicum.* Found in pus from brain and lung abscesses. Pleomorphic, usually in the form of cocci 0.4μ in diameter. Very frequently in pairs, rarely in chains. After inoculation into another animal often takes the form of rods 1 to 1.5μ in length. On sugar-containing media a much swollen, sausage-shaped or oval form was observed, whose colorless "plasmatische" part lies at one pole; the longer forms have colored points at both ends. These forms vary in size from 0.5 to 1μ to 6μ and over in length. The colorless portion of the cell is rich in glycogen.

Cohnia: Winter, 1884.

Rabenhorst Krypt. Flora, Aufl. 2, v. 1, Pilze, Abt. 1, Leipzig, 1884, pp. 37, 39, 48. Cells roundish, surrounded by a gelatinous sheath, so united as to form a spherical or irregular sack-like mass, which finally becomes net-like. Multiplication by transverse division.

Type species (monotypy).—*Clathrocystis roseo-persicina* Cohn. Syn. (Schröter) *Lamprocystis roseo-persicina* (Cohn) Schröter.

Cohnia: Kunth, 1850.
Cohnia: von Reichenbach, 1852.

Cohnistreptothrix: Pinoy, 1911.

According to Pinoy: Bull. de l'Inst. Past., Paris, 1913, p. 931.

Type species.—*Streptothrix israeli* Kruse 1896. An aerobe, difficult to cultivate; no arthrospores; grains composed of filaments which fragment irregularly into portions resembling bacilli or micrococci. True branching is found. Pinoy states that the organism was named *Cohnistreptothrix* because of the fact that Cohn first described an organism of the same morphology under the name *Streptothrix foesteri* from lachrymal concretions. He holds, correctly, that *Streptothrix* was unavailable as a name when used by Cohn because of its use in 1839 by Corda for a fungous genus. (For a detailed characterization of this genus see Chalmers and Archibald, New Orl. Med. and Surg. J., v. 70, No. 5, 1917, p. 463, and Ann. Trop. Med. and Parasitol., v. 10, No. 2, 1916, p. 259.)

Cornilia: Trevisan, 1889.

Gen. e spec. delle Batteriacee, 1889, p. 21. According to De Toni and Trevisan: Saccardo's Sylloge Fungorum, v. 8, 1889, p. 998. Baculi plasmate uniformiter diffuso foeti. Sporae (endorsporae) macrosomae, in partibus medianis tumefactis baculorum normalium immutatis exorientes, numquan (in baculis) apicales.

Includes here: *Bacillus alvei* Cheshire and Cheyne; *B. radiatus* Lüderitz; *B. spinosus* Lüderitz; *B. oedematis-maligni* Hesse; *C. pasteuri* Miquel, etc.

Corynebacterium: Lehmann and Neumann, 1896.

Atlas und grund. d. Bakt., v. 2, München, 1896. According to Weaver's English translation: Atlas and Principles of Bact., Phila., 1901, pp. 127 and 383. Slender, often somewhat bent rods, often clavate; branches rarely observed in young cultures, easily broken off, and often difficult to find even in old cultures. Not motile. No conidia. Stains interruptedly. Clubbed, wedge-shaped and pointed rods frequent. Not acid fast.

Species.—*C. diphtheriae* (Löffler); *C. mallei* (Löffler and Schütz); *C. pseudodiphtheriticum* (Löffler, 1887); *C. xerosis* (Neisser and Kuschbert). Buchanan (J. Bact., v. 3, No. 1, 1918, Balto., p. 55) says the type species is *C. diphtheriae*, Lehmann and Neumann.

Corynemonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 329. Renames the genus *Corynebacterium* Lehmann and Neumann. "Wegen ihres Sauerstoffbedürfnisses passen sie auch gut an diese Stelle des Systems hinein."

Corynethrix: Czaplewski, 1900.

Deutsche med. Wochnschr., v. 26, Berlin and Leipzig, 1900, p. 720. Bacilli with a tendency toward branching and thread-forming. "Pseudodiphtheriebacillen der Lymphe."

Type species (monotypy).—*C. bovis.*

Crenothrix[1]: Cohn, 1870.

Beitr. z. Biol. d. Pflanz., v. 1, Heft 1, Breslau, 1870–1875, pp. 108 and 130, pl. 6. Trichotoma plus minus stricta arcuata vel contorta in caespitulos libere natantes intricata libera vel alia aliis affixa, in modum Oscillariarum cylindrica elongate filiformia basi tenuissima sursum palluatim incrassata subulata vel subclavata divisione transversa succedanea articulata vaginata hyalina, cellularum plasmate homogeneo intus saepe cavo non granuloso, vagina tenerrima hyalina demum indurata nec non ferro intussuscepto flava. Sporangia terminalia apice trichomatum vagina intumescente elongatoclaviformia, gonidiis subglobosis numerosissimis densissime repleta; gonidia duplicis generis, saepissime in filis diversis formata:

1. Microgonidia, e serie cellularum divisione longitudinali et transversa succedanea multi-partitarum orta, rotundata et diaphragmatibus ruptis in sporangium terminale densissime congesta, demum ex apice vaginae erumpentia, in aqua motu lento circumvoluta secedentia vel in cumulos gelatinosos Zoogloeis consimiles coacervata, ciliis destituta globosa ovalia elliptica transverse plus minus constricta vel divisa, demum in trichomata evoluta.

2. Macrogonida, singula e cellulae contento toto indiviso, vel bi-vel quadripartito orta rotundata, ex apice vaginae vix inflatae erumpentia secedentia, motu forma microgonidiis similia sed majora et minus numerosa, demum germinantia.

Sporae? ex articulo trichomatis terminali elongata aucto formata plasmate denso repleta, quod e vagina erumpere et in trichoma Oscillariae forme evolvi videtur.

Type species (monotypy).—*C. polyspora* n. s., caespitulis minutissimis flavobrunneis in aqua libere natantibus, trichomatibus hyalinis longissimis, 0.0015 to 0.005 mm. crassis, articulis aequi-longis vel duplo longioribus vel dimidio brevioribus, sporangiis subclavatis 0.006 to 0.009 mm. crassis, microgonidiis

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[1] See footnote under *Leptothrix*.

0.001 to 0.002 mm., macrogonidiis ad 0.005 mm. latis, sporis terminalibus ad 0.026 mm. longis. Observ. in aqua puteali.

NOTE.—Cohn described this as an alga, but states that if the lack of chlorophyll places a plant among the fungi, then *Crenothrix* must also be placed among the fungi (l. c. p. 125).

Cristispira: Gross, 1910.

Mitt. aus d. Zool. Stat. zu Neapel, v. 20, Heft 1, Aug. 22, 1910, p. 89. Forms a new family Spironemacea, under which he places this genus and Vuillemin's *Spironema*. A spirally bent flexible body with a crista. Multiplication by transverse division, or "Ausbildung einer Scheidewand, meist mit vorhergehender Incurvation."

C. pectinis n. sp. Average length of mature individuals 72μ; average thickness 1.5μ. Greatest number of spirals, 4. Ends slightly rounded. No appendages. Division with incurvation. Hab. Stomach and intestines of *Pecten jacobaeus*. *C. interrogationis* n. s. Average length 25μ by 0.5μ thick. Greatest number of spirals, 3; ends pointed, often hooked. Division unknown. Hab. Same as above species.

Cromobacterium [1]: Bergonzini, 1880.

Annuario della Soc. dei Natur. in Modena, ser. 2, ann. 14, Modena, 1880, p. 149. Violet microbacteria united into a pellicle. Of form and dimensions very analogous to *Bact. termo.*

Type species (monotypy).—*C. violaceum.* Cellular, cylindrical elements usually single, 2 to 3μ long by 0.6 to 1μ. Oscillatory motion. Colored violet by a substance insoluble in water.

Cromococcus: Bergonzini(?) 1880.

Reference as under Cromobacterium, p. 150.

Type species (monotypy).—*C. violaceus.* Author merely states that this is a micrococcus whose colored zoogloeae are soluble in water.

Crypta: Salisbury, 1868.[2]

The Am. J. Med. Sci., n. s., v. 55, Philadelphia, 1868, p. 19. "Minute, transparent, highly refractive algoid filaments, which develop in living organic matter from spores."

Species.—*C. syphilitica* n. sp. A homogeneous filament, with extremities obtusely rounded. No transverse markings, except in early stage of development. Filaments either straight, coiled, or arranged in curves. They develop from spores which may be active or inactive in the connective tissue, and may be transplanted from one individual to another. Believed to be the cause of syphilis. *C. gonorrhoeae.*—Spores very minute and well defined. Often in twos and sometimes in fours, undergoing the process of duplicative segmentation. They occur and develop rapidly in and among the parent cells of the mucous surfaces affected. In some instances the pus cells become filled with the spores of this "vegetation." The filamentous stage of this plant is frequently met with in and among the epithelial cells. In their embryonic stages a moniliform arrangement may be seen at times. In later and more advanced stages they are usually homogeneous throughout their entire length. Occur singly or in little knots. Limited in its invasion to the epithelial tissue. Bergonzini (Lo Spallanzani, An. 12, f. 10, Modena, 1884) places these species among the Schizomycetes.

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[1] Buchanan (J. Bact., v. 3, No. 1, January, 1918, p. 52) states that Zimmerman in Bot. Cent., v. 4, 1880, p. 1528, corrects the spelling of Cromobacterium to Chromobacterium. On the page cited Zimmerman followed the spelling of Bergonzini. Buchanan points out, correctly, that other authors have used *Chromobacterium.*

[2] See footnote under *Zymotosis.*

Cryptococcus: Freire, 1885.

According to Sternberg: Medical News, v. 52, 1888, p. 452. *C. xanthogenicus*.—Isolated from yellow fever patients, and believed by Freire to be the cause of this disease. Very small cells at first which gradually increase in size, 0.001 mm. to .005 to .008 mm. or more in diameter. When fully mature they break up and discharge their contents, composed of spores mixed with a viscous yellow substance and a black insoluble substance. Resists boiling, retaining its form and motility after such treatment. (Dr. Sternberg says that the liquid cultures Freire gave him were impure, and 1 agar culture was a micrococcus.)

Cryptococcus: Kützing, 1833.

Linnaea, 1833, p. 374. *C. nebulosus*. Globulis achromaticis, diameter 1/1200 to 1/1000''', in pelliculam, achromaticam tenerrimam laxe ordinatis.

Cylindrogloea: Perfiliev, 1914.

J. Microbiologie (Russ.), v. 1, No. 3–5, Petrograd, 1914, p. 223.

Type species (monotypy).—*C. bactifera*. A bacterium living symbiotically with *Chlorochromatium aggregatum* Lauterborn. A cylindrical, colorless zoogloeal mass, consisting of an axial filament formed by colorless cells, rectangular and numbering 20 to 35, measuring 0.7 to 0.8μ by 2 to 4μ, separated by interstices and surrounded by a mucilaginous envelope. In this outer mucilaginous zone the green bacteria lie, which Perfiliev says react in the same manner as the green form described by Lauterborn. The axial filament is not easily visible, because of the overlying *Chlorochromatium*.

Cystobacter: Schröter, 1886.

Krypt. Flora v. Schles. Cohn, v. 3, Pilze. Breslau, 1885–1889, p. 170. Cells in the form of short, thin rods, embedded in diffuse slimy mass, later united into long threads. The slimy mass divides into irregular roundish clumps which later are surrounded by an almost hornlike structureless envelope. Syn. (Thaxter) *Polyangium* Link.

Species.—*C. fuscus*. Cysts of 30 to 60μ by 20 to 30μ, chestnut brown, suspended in a thin colorless mass, filled with flesh-red contents which contain short, thin rods. *C. erectus*.—The slime masses are flesh red, cylindric-clavate in form, and support clumps up to 80μ high branched, and later surrounded by chestnut brown cyst-membrane.

Deazotonitraazobacterium: Ambroz, 1913.

Centralbl. f. Bakt., Abt. 2, v. 37, 1913, p. 10. Bacteria which set free elementary nitrogen from nitrates. *D. thermophilum* Ambroz.

Deazotonitranitriazobacterium: Ambroz, 1913.

Centralbl. f. Bakt., Abt. 2, v. 37, 1913, p. 10. Bacteria which set free elementary nitrogen from nitrates and nitrites. *D. thermophilum* Ambroz.

Deazotonitriazobacterium: Ambroz, 1913.

Centralbl. f. Bakt., Abt. 2 v. 37, 1913, p. 10. Bacteria which set free elementary nitrogen from nitrites. *D. thermophilum* Ambroz.

Denitrobacillus: Ambroz, 1913.

Centralbl. f. Bakt., Abt. 2, v. 37, 1913, p. 6. Used by Ambroz apparently to designate his *Denitrobacterium thermophilum*, and not with generic distinction.

Denitrobacterium: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1909, pp. 315 and 335. Denitrifying peritrichiate rods. Oxidize ethyl alcohol to carbon dioxide.

Type species (monotypy).—*D. agile* (*Bacillus dentrificans agilis* Ampola and Garino, 1896).

Denitrobacterium: (Jensen) Ambroz, 1913.

Centralbl. f. Bakt., Abt. 2, v. 37, 1913, p. 3. (Ambroz states that he is following Jensen.) *D. thermophilum*—Rods 3.5 to 7μ long, 1 to 1.8μ broad. Polar spores. Forms a characteristic fluffy white pellicle in the fermentation of nitrate bouillon. Reduces nitrates. According to Harding's classification bears the number 122.4441034. Grows at 70° C. Does not grow below 37° C.

Denitromonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 315. Denitrifying monotrichiate rods. Reduces nitrates to nitrites, then to elementary nitrogen.

Type species (monotypy).—*Bacillus denitrificans* Burri and Stutzer.

Dentalbacterium: Clark, 1879.

Johnston's Dental Miscellony, 1879, p. 447. Half U shaped; 1.5 to 3μ long by 1μ broad. Screw-like motion. Found in the mouth.

Dermacentroxenus: Wolbach, 1919.

J. Med. Research, v. 41, no. 1, Nov., 1919, p. 87.

NOTE.—This organism should probably not be included here, since the author regards it as a new type of parasite. " The reasons for concluding that the parasite of Rocky Mountain spotted fever is not a bacterium, in the ordinary sense of the term, are:

" 1. Its morphological sequence in infected nymphs, and the presence of only one morphological type in the blood of mammals.

" 2. Its staining reactions and its appearance under dark field illumination.

" 3. Its extreme susceptibility to physical and chemical agents.

" 4. Its specificity for the peripheral blood vessels, with the production of an identical type of lesion and disease course in all susceptible mammals."

Wolbach's reasons for not including his organism among the protozoa are chiefly lack of definite morphological proof because of the extremely small size of the parasite, and that protozoa are for the most part highly specialized in their host requirements; his spotted fever parasite has a wide range of mammalian hosts.

Three definite morphological types of the spotted fever parasite can be recognized: (1) An extra-nuclear bacillus-like form without chromatoid granules, relatively large and only present in ticks during the initial multiplication of the parasites; (2) a relatively small rod-shaped form with chromatoid granules, probably the same form seen within nuclei in sections of ticks, and rarely in smooth muscle cells in the blood vessels of mammals; and (3) a relatively large lanceolate paired form present in ticks and in the blood and lesions in mammals. This lanceolate form is characterized by its " chromatoid " staining reaction, and according to the evidence at hand is the form in which the virus is passed between the tick and mammalian hosts. The other two forms described are multiplicative stages, and can be demonstrated only occasionally and with difficulty in mammalian hosts. Cultivation experiments unsuccessful. Cause of Rocky Mountain spotted fever.

Type species (monotypy).—*Dermacentroxenus rickettsi*.[1]

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[1] Named in honor of Ricketts who first saw it in the blood. Wolbach states that the name " Rickettsia " has been applied by da Rocha-Lima to minute bacillary forms found by Hegler and Prowazek in typhus fever, and regarded as identical with bodies described by Ricketts in Mexican typhus. He thinks that the available descriptions of Ricketts are too meager to permit a trustworthy comparison with the spotted fever parasite, but as Rickett's description of the typhus organism, which he regarded as a bacterium of the plague bacillus group, is markedly different from his description of

Detoniella: Trevisan, 1889.

According to Saccardo's Sylloge Fungorum, v. 8, 1889, p. 929. Filamenta cylindrica, vagina crassa vel crassiuscula persistente obducta, articulata, simplicia, basi ab apice superiori distincta, propter pulcinulum mucosum primitus affixa immobilia, serius libere natantia, lente oscillantia et in strata varie implexa. Cocci constanter nulli. Multiplicatio baculogonidiis e vagginae apice egredientibus, primitus vivacissime mobilibus, cito immotis. Arthrosporae 4 to 5 in singulis articulis baculiformibus obvenientes.

Includes: *Conferva ochracea* Roth 1797. Syn. (Trevisan) *Oscillatoria ochracea* Greville; *Leptothrix ochracea* Kützing.

Dicoccia: Trevisan, 1889.

Gen. e Spec. delle Batteriacee, 1889, p. 26. According to Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1034. Baculi Klebsiellae, capsulis, inclusiplasmate polaridiblastico foeti; sporae, ignotae. Obs. Ut Pasteurella a Bacillo, hoc genus a Klebsiella distat.

Type species (monotypy).—*D. glossophila.* Baculis brevibus, apicibus valde rotundatis, medio leviter constrictis. Hab. in secretione buccali hominis.

Didymohelix: Griffith, 1853.

Ann. and Magaz. of Nat. Hist., ser. 2, v. 12, London, 1853, p. 438. Thinks the true structure of *Gallionella ferruginea* has hitherto been misinterpreted. He therefore places it in a new genus.

Type species (monotypy).—*D. ferruginea* (Ehrenberg). Filaments very minute 1/5000 to 1/30000 inch wide. Each filament consists of two interlacing fibres, forming flattened compound spirals. Fibres are colored by deposits of peroxide of iron.

Diffusionsbacillus: Beijerinck, 1893.

Centralbl. f. Bakt., Abt. 1, v. 14, 1893, p. 830. A species closely related to *B. perlibratus.* Probably did not intend to use it as a generic name.

Diplectridium: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 147. Cells rod like. Division in but one direction; motile by means of diffuse flagella. Cells usually long, cylindrical, with both ends head-shaped, and a spore in each end.

Type species (monotypy).—*B. solmsii* Klein.

Diplobacillus: Weichselbaum, 1887.

Centralbl. f. Bakt., Abt. 1, v. 2, 1887, p. 212.

Type species (monotypy).—*D. brevis endocarditidis.* The cause of ulcerous endocarditis. Short rods with rounded ends, arranged singly or in pairs. Poles usually remain unstained, except in very young individuals.

Diplobacterium: Billet, 1890.

Bull. Scient. de la France et la Belgique, v. 21, ser. 3, Paris, 1890, p. 23. Rectilinear forms of "éléments bactériens" in pairs.

Diplococcos: Billroth, 1874.

Untersuch. ü. die Vegetationsformen v. Coccobacteria septica, Berlin, 1874, p. 16, Pl. I, fig. 4a. Spherical cells in pairs. One of the growth forms of *Coccobacteria septica.*

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the spotted fever organism in blood, the name "Rickettsia" can not be considered as applicable to the spotted fever organism, as described by Wolbach. He concludes that "much more work is required before the classification of 'Rickettsia' and its relation to typhus fever can be arrived at."

Diplococcus: Weichselbaum, 1886.[1]

Medizin. Jahrb. v. 82, N. Folge 1, 1886, p. 506.

Type species (monotypy and subsequent designation by Buchanan in J. Inf. Dis., v. 17, No. 3, 1915, p. 531).—*D. pneumoniae.* Medium-sized, oval, lancet-shaped, sometimes also round, cocci, which usually occur in twos, rarely in short chains, which are either straight or slightly curved. Capsule present, usually thinner than the diameter of the coccus, but sometimes many times thicker. Zoogloeae. Found in exudate from acute inflammation of the human lung.

Diplococcus: (Weichselbaum) emend. Winslow and Rogers, 1906.[2]

See first reference under *Albococcus*, p. 205. Strict parasistes. Not growing, or very poorly, on artificial media. Cells normally in pairs surrounded by a capsule. Include *D. pneumoniae* Weichselbaum, *D. weichselbaumii* Trevisan, and *D. gonorrhoeae* Neisser.

Type species (subsequent designation by Buchanan in J. Inf. Dis. v. 17, no. 3, 1915, p. 531).—*D. pneumoniae* Weichselbaum.

Diplokokkus: Klebs, 1887. (And other German writers.)

Die Allg. Path. Klebs, Jena, 1887, pp. 321, 326. *D. gonorrhoïcus; D. coryzae.*

Diplopneumococcus: Krokiewicz, 1904.

Weiner Klin. Wochschr., 19.4, No. 20. According to Centralbl. f. Bakt., Abt., 1, v. 36, Ref. p. 561.

Diplostreptococcus: Schütz, 1887 (?).

D. pleuro-pneumoniae.—According to Pfeiler, Zs. f. Immunität., v. 2, 1909, p. 21, and von Lingelsheim: Handbuch d. Path. Mikroorg., Kolle u. Wassermann, ed. 2, v. 4, 1912, p. 494.

Diplovibrio: Billet, 1890.

Bull. Scient. de la France et la Belgique, v. 21, ser. 3, Paris, 1890, p. 23. Vibrios in pairs.

Discomices: (Rivolta) Migula, 1899-1900.

Syst. der Bakt., v. 2, 1899–1900, p. 116. Variant of *Discomyces* Rivolta.

Discomyces: Rivolta, 1878.

Clinica Veterinaria, Nos. 7, 8, and 9, Anno 1, Milano, 1878, pp. 169 and 201. See also Giornale Guglielmo da Saliceto, Piacenza, 1879, No. 5, p. 145, and Giornale di Anat. Fis. e. Patologia degli Animali, v. 16, Pisa, 1884, pp. 195 and 197, and idem v. 14, 1882, p. 20.

Type species.—*Actinomyces bovis* Harz. Rivolta renames the organism described by Harz as the cause of actinomycosis in cattle, stating that Harz erroneously considered the organism a ray fungus. He thinks the elongated branches, dilated at the free extremity can not be compared to gonidia; propagation occurs simply by means of numerous buds (germogli) produced at the free summit of the branches, which become the primary branches of a new disk (all disks originating from the branches of older disks). He describes the disks as being composed of primary, secondary, and very small tertiary branches, in none of which was any segmentation observed. The tertiary branches are very numerous, of diverse form and length, some having swollen ends, club-shaped or bifurcate, others simply rounded off, with no enlargement. The primary are the older branches which join to a substance which might be considered as a base. As to his further reasons for changing the name of Harz: “Il complesso od una colonia di corpuscoli discoidi non può in alcun modo essere paragonato alle botriti, al monosporio ed alla polyactis: peroochè queste specie e nel micelio e negli *ifi* e nella produzione di spore offrono tipi caratteristici, che nulla hanno di commune col così dette *Actinomyces bovis*. È vero che i corpuscoli discoidi compressi si risolvono in pennelli od in ventagli [under slight pressure] fatti da rami e ramoscelli, ma percio non si ponno dire *raggiati*. Questa parola in storia naturale ha un senso ben determinato. Il complesso dei dischi che ci rappresenta, se si vuole, un micelio, non ha la forma raggiata, e per conseguenza non si puo denominar raggiato o come venne detto *actinomyces*, e nemmeno si debbono indicare i danni o le lesioni che produce con la parola *actinomicosi*. Il solo nome conveniente, a mio avviso, sarebbe quello di *Discomyces bovis*, e con la parola *sarcomicosi* si potrebbero indicare le lesioni che produce nel corpo del bue” (pp. 207, 208).[1]

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[1] First binomial combination.

[2] The Com. Soc. Am. Bact. (J. Bact., v. 5, no. 3, 1920, p. 206) further emend *Diplococcus* to include only Gram positive cocci. Fermentative powers high.

Dispora: Kern, 1882.

Biol. Centralbl. v. 2, Leipzig, 1882, p. 135.

Type species (monotypy).—*Dispora caucasica*. Found in symbiotic relationship with *Saccharomyces cerevisiae* Meyer in “kephir” a fermented milk of the Caucasus. The bacteria occur in the clumps of the kephir in a zoogloeal state. Their vegetative cells are 3.2μ to 8μ long by 0.8μ broad. A definite cell membrane present. Polar flagellum. Long Leptothrix-like threads rare. Spores round, measuring 0.8μ to 1μ, and when germinating 1.6μ. In the vegetative state not unlike *B. subtilis* Cohn, from which it differs in its spore formation, i. e., there are always two “endstandige” spores in every cell.

Drepanospora: Petschenko, 1911.

Arch. f. Protistenk. v. 22, 1911, p. 282, 56 figs.

Type species (monotypy).—*D. mülleri* n. g., n. sp. Order Eubacteria, fam. Spirillaceae occupying an intermediate place between *Spirosoma* Migula and *Microspira* Schröter. Cells with 2 spirals, one end pointed, the other somewhat rounded. No cilia or flagella. Helicoidal motion. “Pas de division cellulaire.” Endospores. Regular spherical colonies formed by the individuals in certain stages of development. Measure 7μ long by 0.75μ wide. Cell membrane visible on the living cell. In the vegetative state protoplasm composed of an anterior, smaller, strongly refractive part, and a larger posterior or dull part. The anterior portion he considers to be nuclear. Parasitic in bodies of *Paramoecia*.

Drepanospora:[2] Barkeley and Curtis (date?).

According to Engler and Prantl. Die Natürlichen Pflanzenfamilien, Lief. 196 and 197, 1 Teil, 1 abt. Leipzig, 1900, p. 480. A fungus genus belonging to the Hyphomycetes. Type: *D. pannosa*.

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[1] For the validity of this genus see Merrill and Wade, The Philippine J. of Sci., v. 14, No. 1, Manila, 1919, p. 55. They correctly state that the name *Discomyces* Rivolta “was practically ignored until Blanchard (1900) argued its priority over Nocardia. Subsequently Gedoelst, Brumpt, Manson, Stitt, and for a time Castellani and Chalmers adopted it.” They consider it clearly valid over *Actinomyces* and all subsequent names, but do not argue for its adoption on the strength of Rivolta's reasons for its substitution, which they regard as inconsequential, but because of the earlier use of *Actinomyce* by Meyen. They place the genus among the fungi. These authors continue: “The fact that subsequently Rivolta erroneously referred other organisms to this genus has no bearing on the case. His original application of it was to the organism of Bollinger and Harz alone, which is, therefore, the type of the genus. Nor does the fact that, to propitiate Harz, Rivolta later agreed to accept *Actinomyces* affect the question. As Blanchard pointed out, a name once introduced is no longer the property of its originator to withdraw or modify at will.”

[2] Not included in Berkeley's Introducton to Cryptogamic Botany, 1857.

Eberthella: Buchanan, 1918.

J. Bact., v. 3, No. 1, January, 1918, Balto., p. 53. A subgenus of *Bacterium.* Organisms not showing maximum fermentative power, never producing gas in lactose, frequently pathogenic, never liquefying gelatin, producing gas from none of the carbohydrates. Acid sometimes formed.

Type species (original designation).—*Bacterium* (*Eberthella*) *typhi* Flügge.

Eiterbacterium: Küttner, 1895.

Zeit. f. Hyg. 19, H. 2, p. 263, Syn. (Küttner) *Pyobacterium fischeri* Küttner.

Eitercoccus: Rosenbach, 1884, and many others in literature.

Mikroorganismen bei den Wundinfectionskrankheiten des Menschen. Wiesbaden, 1884, p. 23.

Eiterkettencoccus: Rosenbach, 1884, and many others in literature.

Same reference cited for *Eitercoccus*, p. 26.

Enchelys: Hill, 1752: History of Animals, 1752, p. 2.

Oken, 1815: Lehrb. Naturgeschichte, 1815, 3, 1, p. 36. According to Ehrenberg (Die Infusionsthierchen, etc., 1838, p. 299), *E. bacillus* Oken is syn. with *Vibrio bacillus* Müller.

Endobacterium: Lehmann and Neumann, 1896.

Atlas u. Grund. d. Bakt., v. 2, München, 1896, p. 103. They mention it as an appropriate name for *Bacillus* (Cohn) Hüppe, but do not propose it because of their desire not to introduce a new name.

Endostreptokokkus: Hueppe, 1891.

Die Meth. d. Bakt.-Forschung, Ed. 5, Wiesbaden, 1891, p. 33. Coccus cells united in chains; with endospores; zoogloeae.

Enterococcus: Lewkowicz, 1901.

Przeglad Lekarski, 1901, No. 5–7. According to Lewkowicz's review of this paper in Centralbl. f. Bakt., Abt. 1, v. 29, p. 635. An organism causing epidemic dysentery. Occurs usually as a diplococcus, but also in short chains. Capsulated. No species named.

Enterococcus: Rougentzoff, 1914.

Ann. Inst. Pasteur, v. 28, Paris, 1914, p. 648. *E. saccharomyces.* A non-proteolytic aerobe and facultative anaerobe found in the intestinal tract of rabbits.

NOTE.—The references to this genus in literature usually refer to Thiercelin as the author. In Compt. Ren. Soc. de Biol. Paris, 1899, p. 271, Thiercelin describes a diplostreptococcus causing acute entero-colitis in infants. In its morphology and biology he says it closely approaches the meningococcus. The only name he applies to this species, however, is "enterocoque."

Erebonema: Römer, 1845.

Die Algen Deutschlands, Hannover, 1845, p. 70. Trichomata distincte articulata, laxissime intricata, achromatica, ramosa, inter matricem muco-gelatinosam ex globulis mucosis minutissimis compositam nidulantia; articuli cavi, flaccidi, ramulorum ultimi dilatati.

Type species.—*E. hercynicum,* which Schröter (Krypt.-Flora v. Schlesien. Cohn, v. 3, part 1, 1885–1889, p. 152) states is synonymous with his *Leucocystis cellaris.*

Erwinia: Winslow, Broadhurst, Buchanan, Krumwiede, Rogers and Smith, 1917.

J. of Bact., v. 2, No. 5, Sept., 1917, p. 560. Family Bacteriaceae Cohn, 1872, emended. Plant pathogens: Growth usually whitish, often slimy.

Indol generally not produced. Acid usually formed in certain carbohydrate media, but as a rule no gas. Authors in 1920 (J. Bact., v. 5, no. 3, 1920, p. 209) make the type *E. amylovora* Burrill, 1883.

Erysipelcoccus:

This name has been ascribed by numerous authors to Fehleisen. In Sitz. d. Phys.-Med. Gesellsch. z. Würz., 1881–1885, p. 126 (1881) and p. 9 (1883), he described a micrococcus "der Mikrokokkus des Erysipels." In his second paper he uses in the title of the paper the word "Erysipelkokken," but in the text he uses "mikrokokken."

Erysipelococcus:

See Lipp. Med. Dict., Phila., 1910, p. 322, syn., *Streptococcus erysipelatis.*

Erysipelothrix: Rosenbach, 1909.

Ztschr. f. Hyg., v. 63, 1909, p. 367. See also Verhandl. d. deutsche Gesell. f. Chirurgie. 16th Cong., Berlin, 1887, p. 75. Much like *Cladothrix dichotoma,* but usually much smaller. Roundish, longish bodies, larger than *Staphylococcus,* often in threads, straight or irregularly curved or spiral. Length varies from that of a very short bacillus to one stretching entirely across the field. The threads possess side branches; this does not, however, represent true dichotomy. Some of the threads possess thick points which are probably spores. Not motile.

Species.—E. porci, causing "schweinerotlauf," and *E. erysipeloides* (erysipeloid). *E. murisepticus.* Buchanan (J. Bact., v. 3, No. 1, 1918, p. 55) gives the type species as *E. rhusopathiae* Rosenbach (*E. porci*).

Erythroconis: Oersted, 1840–41.

Naturhistorisk Tidskrift, Kroyer, v. 3, 1840–41, p. 555, pl. 7. Massa pulveracea, parum mucosa ex corpusculis quadratis rigidis fragilibus per quaterna aggregatis constans. Genus e familia Diatomearum analogon Palmellae et Tetrasporae.

Type species.—E. littoralis, n. sp. Migula says this is synonymous (?) with *Thiopedia rosea* Winogradsky.

Erythrobacillus[2]: Fortineau, 1905.

Compt. Rend. de la Soc. de Biol., v. 1, Paris, 1905, p. 104.

Type species (monotypy).—*E. pyosepticus.* A motile "coco-bacille," with no spores; flagella; Gram negative; grows at 37° C., red pigment forms best at 19° to 22° C. Pigment soluble in water, the alcohols, slightly so in chloroform, and insoluble in ether, carbon bisulphide, benzine. Pathogenic for the guinea pig, etc. Isolated from the chemise of a patient at the Hôtel-Dieu, Nantes.[2]

Estaphlycoccus: In Portuguese literature.

Variant of *Staphylococcus.*

Estreptococcus: In Portuguese literature.

Variant of *Streptococcus.*

Eubacillus: Dangeard, 1890–91.[1]

Le Botaniste, ser. 2, 1890–91, Poitiers, p. 151. Vegetative filaments simple, of variable length; hyalin protoplasm, without granulation; chlorophyll diffuse, in very slight quantity throughout the protoplasm. Sporiferous filaments simple or branched; green color more pronounced in swollen parts; spores formed by contraction of the protoplasm of the enlarged portions—this protoplasm abandons its wall little by little, becomes more intensely green and refringent, and surrouns itself with a membrane; spores grouped or isolated.

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[1] Several authors have questioned the bacterial nature of the organism described by Dangeard. See Migula, same reference as for *Planococcus,* p. 94.

[2] Committee Soc. Am. Bact. (J. Bact., v. 5, no. 3, 1920, p. 209) emend and change type to *E. prodigiosus* (Ehrenberg) Committee.

Type species (monotypy).—*E. multisporus.* Vegetative filaments very long and thin; of delicate green color. Sporiferous filaments also long and inclosing numerous spores, isolated or grouped in twos, threes, or fours, separated by partitions. Spores elliptical and of appreciable green color, containing 1 or 2 refractive granules. Spores 5 to 8μ by 3μ wide. Found in fresh water.

Eubeggiatoa: Hansgirg, 1888.

A subgenus (sect.) of "*Beggiatoa* Oesterr." Bot. Zeitschr. v. 38, 1888, p. 263. Colorless threads, united into chalk-white to gray-yellow slimy masses. Includes *B. alba* (Vaucher) Trevisan. *B. arachnoidea* (Agardh) Rabenhorst.

Eucoccus: Migula, 1895.

Die Natürlichen Pflanzenfamilien, Engler & Prantl. Teil 1, Abt. 1*a* and 1*b*, Leipzig, 1896, Lief. 129, p. 16. Cell content colorless, free of sulfur granules. Later he makes it a subgenus of *Micrococcus.*

Eu-cornilia: Trevisan, 1889.

Gen. e Spec. d. Batt., 1889, p. 21. According to Saccardo's Sylloge Fungorum, v. 8, 1889, p. 998. A subgenus of *Cornilia* Trevisan.

Eucrenothrix: Hansgirg, 1891.

Bot. Zeit., Leipzig, 1891, p. 314. A fresh water plant.

Type species (original designation).—*Crenothrix kühniana* (Rabenhorst) Girad. *C. polyspora* Cohn cum synonymous.

Eu-Klebsiella: (?).

A subgenus of *Klebsiella* Trevisan? The authorship has been given to Trevisan, who used this name for a subtribe only, writing it *Eu-Klebsielleae.* See Saccardo: Sylloge Fungorum, v. 8, 1889, p. 1028.

Eumantegazzaea: De Toni and Trevisan, 1889.

Saccardo's Syllog. Fung., v. 8, 1889, p. 942. A subgenus of *Mantegazzaea* Trevisan. Species achroae, baculis granula sulphuris nulla foventibus.

Eümonas: Diesing, 1850.

Systema Helminthum v. 1, Vindobonae, 1850, p. 22. Subgenus of *Monas* Müller & Ehrenberg. Diesing says *Monas* is synonymous with *Bodo* and *Bacterium* Ehrenberg. *Eümonas:* Animalcula solitaria libera,. corpus ecaudatum, subglobosum, ovatum, v. obconicum, hyalinum v. coloratum, haud mutabile, divisione spontanea simplici bipartitum, v. indivisum. Os terminale truncatum, limbo ciliatum v. nudum. Flagellum nudum oscellus nullus. Includes 20 species: *Monas* (*Eümonas*) *crepusculum* Ehrenberg, *M.* (*Eümonas*) *bicolor* Ehrenberg, *M.* (*Eümonas*) *ochracea* Ehrenberg, *M.* (*Eüminas*) *hyalina* Ehrenberg, etc.

Eu-Pacinia: Trevisan, 1889.

Gen. e Spec., d. Batt., 1889, p. 23. From Saccardo's Sylloge Fung., v. 8, 1889, p. 1915. Baculi recti vel rara levsisime curvuli interdum in filamenta subrecta consociata. Arthrosporae magnae, quadruplo-octuplo recta vel et ultra diametri transversalis baculorum latiores.

A subgenus of *Pacinia* Trevisan.

Euplanococcus: Migula, 1895.

See reference for *Eucoccus*, p. 19. Cell content colorless, free of sulfur granules.

Euplanosarcina: Migula, 1895.

See reference for *Eucoccus*, p. 20. Subgenus of *Planosarcina*. Cell content colorless, without sulfur granules.

Eupseudomonas: Migula, 1895.

See reference for *Eucoccus*, p. 29. A subgenus of *Pseudmonas*. Cell content colorless, without sulfur granules.

Eusarcina: Migula, 1895.

See reference for *Eucoccus*, p. 18. A subgenus of *Sarcina*. Cell content colorless, without sulfur granules.

Euspirillum: Migula, 1895.

See reference for *Eucoccus*, p. 33. Cell content colorless. Subgenus of *Spirillum*.

Euspirosoma: Migula, 1900.

System der Bakt. v. 2, Jena, 1900, p. 955. A subgenus of *Spirosoma* Migula. Cells free, i. e., not inclosed in a gelatinous membrane; single or united into a screwlike wound thread.

Fenobacter: Beijerinck, 1900.

Centralbl. f. Bakt., Abt. 2, v. 6, 1900, p. 200. See also Arch. Néerl. ser. 2, v. 4, 1900–1901, p. 9. Aerobic bacteria, closely related to *Aerobacter* Beijerinck. Author states that the "Heupilze" is representative of this group.

Ferribacterium: Brussoff, 1916.

Centralbl. f. Bakt., Abt. 2 v. 45, 1916, p. 547. According to review in Bull. l'Inst. Pasteur, Paris, April, 1917, p. 194.

Type species (monotypy).—*Ferribacterium duplex*. Nonmotile, yellow rodlets, with rounded ends, 2.5 to 5μ, by about half as wide. Usually in pairs, but also single and in short chains. A gelatinous sheath usually present, surrounded by a ferric secretion.

Fusiformis: Hoelling, 1910.

Arch. f. Protistenk., v. 19, Jena, 1910, p. 240, 1 pl. Spindle-shaped organisms containing demonstrable nuclei [Haidenhain (E–H), and Romanowsky-Schilling methods].

Type species (subsequent designation by Committee in J. Bact., v. 2, 1917, p. 555).—*F. termitidis* Hoelling. Hoelling is probably renaming here *Bacillus fusiformus*. Also mentions *Fusiformis muris* and *F. dentium*.

Gaffkya: Trevisan, 1885.

Atti. d. Accad. fisio-med.-statis. in Milano, 4 ser., v. 3, 1885, p. 106. Cocci in colonies of 4, globose, surrounded by a hyaline capsule, finally free.

Type species (monotypy).—*G. tetragena*. Syn. *Micrococcus tetragenus* Gaffky.

Gaillonella:[1] Bory de St. Vincent, 1823.

Dict. classique d'Hist. Nat., v. 4, 1823, p. 393. See also idem, v. 7, 1825, p. 101. Simple cylindrical filaments, articulated, each section including two capsulary corpuscles, spheroidal, transparent, even when filled with ferruginous coloring matter, and divided into two equal parts by a "dissépiment" which appears as a line. "Nous n'hésitons pas à regarder les Gaillonelles comme de simples végétaux."

Type species (original designation).—*Conferva moniliformis* Müller. Places *C. nummuloides* here also.

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[1] This genus is included following Ellis (Cent. f. Bakt., Abt. 2, v. 19, 1907, p. 505).

Galactobacterium: Guillebeau, 1890.

Land. Jahrb. d. Schweiz, v. 4, 1890, p. 43. Occurring sporadically in inflamed udders. No description.

Galactococcus: Guillebeau, 1890.

Landw. Jahrb. d. Schweiz, v. 4, 1890, p. 32.

Species.—*G. versicolor* n. sp. Cocci of about 1μ diameter. Nonmotile. Gram positive. Long chains in milk, which is rapidly acidified. Aerobe. Belongs to the "häufigeren Mastitispilzen." *G. fulvus* n. sp. Cocci of not more than 1μ diameter. Nonmotile. Gram positive. Ochre-yellow on potato. *G. albus* n. sp. Cocci about 1μ diameter. Nonmotile. Gram positive. White colonies on milk gelatin, which is not at all or only slightly liquefied. Dirty white growth on potato. All of these species found in milk from an inflamed udder.

Gallionella: (Bory de St. Vincent) Ehrenberg, 1836.

Variant of *Gaillonella* Bory de St. Vincent. Abhandl. König. Akad. d. Wissensch. z. Berlin, 1836, pp. 52 and 84. See also Poggendorf's Ann. d. Physik. u. Chem. 2, v. 8, 1836, p. 217, and Die Infusionsthierchen, 1838, pp. 166 and 169. *G. ferruginea.* Corpusculis, tenuissimis, utrinque convexis, ovatis, glabris, ferrugineis, filis articulatis, saepe, conglutanis, subramosis. Found in iron waters. Includes several other species. See Ellis: Centralbl. f. Bakt., Abt. 2, v. 19, 1907, p. 505.

Gallionella: (Ehrenberg) em. Ellis, 1907.

Cent. f. Bakt., Abt. 2, v. 19, Jena, 1907, p. 505. Ellis places this genus among the thread bacteria (see footnote under *Leptothrix*). Long cylindrical thread, bent first in the form of a hairpin, then spirally around itself. Ends rounded off in the same way as those of bacillus cells. The spiral winding produces a number of loops which may be few or many according to the age and condition of the individual. Average thickness of thread is 0.5μ to 0.75μ, but may attain 1.5μ in diameter. Great disparity of size in same culture. Sometimes threads not wound. Migula's membrane not demonstrated. Multiplication by cell division [as shown by Migula], and by conidia formation. Conidia of same size and shape as those in *Leptothrix ochracea* and *Spirophyllum ferruginea* Ellis. Threads nonmotile and contain large deposits of ferric hydroxide.

Gleobacter: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 135. Rod bacteria, capsulated. Syn. (Fischer) *Klebsiella* Trevisan.

Gloeosphaera: Rabenhorst, 1854. An algal genus.

Algen Mitteleuropas n. 387. Hedwigia, v. 1, Dresden, 1854, p. 43, pl. 8, fig. 2. Species: *G. ferruginea* (Kützing). Syn. (Ellis) *Gallionella ferruginea* Ehrenberg.

Gliabacteria: Billroth, 1874.

Untersuch. u. die Veg. v. Coccobacteria septica, Berlin, 1874, p. 15. Rod forms which arise from the "dauersporen" or *Gliacoccos*, and are surrounded by a gelatinous substance which unites them into greater or less groups. Nonmotile at first, later motile, especially along the periphery of the colonies. See *Coccobacteria.*

Gliacoccos: Billroth, 1874.

Reference as for *Gliabacteria*, pp. 5 and 6, Pl. I. Cocci growing on the upper surface of liquids which surround themselves with a gelatinous membrane forming irregular heaps and balls. See *Coccobacteria.*

Gliacoccus: Maggi, 1886.

According to Winslow, Broadhurst, Buchanan et al. J. Bact. v. 2, No. 5, Baltimore, 1917, p. 551. Syn. (?) with *Mycoderma* Persoon.

Glia-Kokkus: Klebs, 1887.

Die Allg. Path., Jena, 1887, p. 310. Variant of *Gliacoccos.*

Glischrobacterium: Malerba and Sanna-Salaris, 1888.

Rend. d. Accad. d. Sci. Fis. e Mat., Ser. 2, v. 2, Anno 27, Fasc. 6, 12, Napoli, 1888, pp. 196 and 495. See also Archiv. ital. de Biol. v. 10, Fasc. 2, 3, p. 358. The cause of viscid and thready urine. A somewhat elongated micrococcus, 1.14 to 0.57μ long by 0.41μ wide. In beef bouillon it is a very short bacillus, with a weak rotatory motion. Single or in twos or long chains. In gelatin cultures bubbles of gas are formed more or less completely surrounded by a "glischrogenic" substance.

Gloeotila: Kützing, 1843.

Phyc. gener. Leipzig, p. 245. Defined here as an alga. *G. ferruginea* Kützing is syn (?) with *Gallionella ferruginca* Ehrenberg.

Glöokokkus: Klebs, 1887.

Die Allg. Path., Jena, 1887, p. 329. Changed spelling of Billroth's *Gliacoccos.*

Gonium: Ehrenberg, 1828.

Symbolae Phys., 1828, p. 34. See also Abhandl. König. Akad. d. Wiss. z. Berl., 1830 (1832). Schröter (Krypt.-Flora v. Schlesien. Cohn. v. 3, Part 1, 1885–89, p. 151) says *Gonium hyalina* is syn. with *Lampropedia hyalina,* and *Merismopedia hyalina* Kützing.

Gonococcus: Migula, 1895.

Die natürl. Pflanzenf. Engler & Prantl. Teil 1, Abt. 1*a*, Lief. 129, Leipzig, 1896, p. 16. Migula gives: *Micrococcus gonorrhoeae* (Neisser) Flügge (=*Gonococcus gonorrhoeae* Neisser). Lindau (Just's Bot. Jahrb. v. 26, 1898, pp. 100 and 101) also uses the name generically: *G. neisseri.* Also Paldrock (Derm. Centralbl. v. 7, Leipzig, 1905, p. 322). It is used in the generic sense in the indices and by reviewers in the Centralbl. f. Bakt., Abt. 1 (v. 27, 1900, p. 893, v. 24, 1898, p. 1006, etc.). The organism referred to in these references is undoubtedly that discovered by Neisser, but in none of his publications did he use the name in the generic sense. His first paper is in the Cent. f. medizin. Wissensch. v. 17, 1879, No. 28, p. 497, where he describes the organism in detail. In some of his later papers (e. g., Deut. med. Woch. No. 20, May 13, 1882) he uses the term "gonokokken."

Granulobacillus: Schattenfroh and Grassberger, 1899.

Centralbl. f. Bakt., Abt. 2, v. 5, Jena, 1899, p. 702. Genus differs from *Granulobacter* Beijerinck in that it includes both nonmotile and motile forms.

G. saccharobutyricus immobilis liquefaciens.—Nonmotile liquefying gelatin. Spores formed only on highly alkaline media, and they are of many sizes and forms, and placed differently within the rods. Hiss and Zinsser [Textbook of Bact., Ed. 4, N. Y., 1918, p. 472] state that this species is probably identical with *Bacillus aërogenes capsulatus* Welch and Nuttall, 1892.

G. saccharobutyricus mobilis nonliquefaciens.—Motile, not liquefying gelatin. Says the "Buttersäurebacillus I" of Gruber belongs here, also *B. saccharobutyricus* Klecki, and *Granulobakter saccharobutyricum* Beijerinck.

Granulobacter: Beijerinck, 1893.

Verhandl. d. Koniklijke Akad. v. Wetensch., Deel I, No. 10, 1893, p. 3. "Butyl ferment organisms." Obligatory or facultative anaerobic. Become filled with granules and assume a clostridium form. In the presence of oxygen motile rods result. Always CO_2 and usually hydrogen as a result of fermentation.

Species.—G. butylicum. Syn. (Beijerinck) *B. amylobacter* (van Tieghem, 1877) Gruber. *Granulobacter saccharobutyricum.* Syn. (Beijerinck) *Bacillus butylicus Fitz, G. polymyxa* (Prazmowski), etc.

Granulobakter: Schattenfroh and Grassberger, 1899.

Centralbl. f. Bakt., Abt. 2, v. 5, Jena, 1899, p. 702. Variant of *Granulobacter* Beijerinck.

Grippestreptokokkus: Seligman, 1911.

Centralbl. f. Bakt., Abt. 1 Ref., v. 50, 1911, pp. 81–83. An organism which he states to be a new species of *Streptococcus.* Single, in pairs and chains.

Gyrococcus: Glaser and Chapman, 1912.

Science, n. s., v. 36, No. 920, 1912, p. 223.

Type species (monotypy).—*G. flaccidifex gen. et spec. nov.* Cells in free state spherical, becoming slightly oblong just before division. Division in 1 direction only. After division each half may be spherical or may come to an abroupt tip, assuming a more or less heart-shaped appearance. Frequently the two halves are unequal; one-half may be spherical while the other may be more or less heart-shaped, or slightly oblong. If cells remain connected after fission, chains of 3 or 4 are formed. Diameter of cells 0.51µ to 0.85µ. No endospores. Capsule distinct. Motile—progressing in a gyrating manner, but no flagella were stained. Gram negative. Very closely resembles the Pneumococcus, except that it is Gram negative, and motile. Cause of wilt disease or "flacheria" of the gypsy moth.

Haematococcus: Agardh, 1828.

Icones Algarum Europaearum, Leipzig, 1828, pp. 45–50.

H. noltii.—Globulis elliptico-sphaericis sanguineis includentibus granulo conferta numerosa. In stagnis turfosis slesvici tempore verno.

H. grevillii.—Globulis exacte sphaericis minutissimis viride purpureis includentibus granula subdena.

H. sanguineus.—Globulis ellipticis minutis pellucidis includentibus granula pauca rosea laxe disposita.

Haematococcus: Babes, 1889.

Virchow's Arch., 115, Folge XI, v. V, 1889, p. 106. See also Compt. Rend. de l'Acad. d. Sci. de Paris, v. 110, 1890, pp. 800 and 975; Centralbl. f. Bact., Abt. 1, v. 33, 1902, p. 456, and Ann. de l'Inst. de Bact. Bukarest, 1888–89.

H. bovis.—Biscuit-shaped cocci united in pairs, sometimes oblong in form. Isolated or in groups. The single cocci are surrounded by a pale yellowish halo. Syn. (Migula, Syst. d. Bakt., v. 2, 1900, p. 85) *Micrococcus bovis* (Babes) Migula. Flügge (Die Mikroorganismen, v. 2, 1896, p. 620) says this species is synonymous with *Babesia bovis* Starcovici. Cause of hemoglobinuria in cattle.

Haematokokkus: Eisenberg, 1891.

Bakt. Diagnostik, Hamburg, 1891, p. 271. Variant of *Haematococcus.*

Halibacterium: Fischer, 1894.

Die Bakterien des Meeres. Fischer, B., Leipzig, 1894, 82 pp. Of varying form and size, but usually comma-like or S-shaped. Spherical form rare. Found in sea water. The majority of these organisms require a rather high salt content in their media: To 5 c.c. of the usual nutrient agar, 2 c.c. of ocean water with a salt content of 3.5 per cent were added. Some of them grow very feebly and others not at all (*H. polymorphum*) on media containing the usual amount of salt; those which do show feeble growth on the usual gelatin or agar give none of their characteristic reactions on such media. The most satisfactory media were those made by using sea water, to which was added the proper amount of nutrient agar or gelatin.

Type species (first in order or arrangement in text).—*H. pellucidum.* Small to medium rods, almost coccus-like, single, in 2's, or short chains of not more than 4 or 6. Often in zoogloeal masses. Somewhat longer, spindle-shaped rods also observed, as well as comma-like and S-shaped forms, and straight or curved inarticulate short threads which are sometimes irregularly wound, screw-like. Usually actively motile. On gelatin the colonies are round, gray, transparent, drop-like. Gelatin not liquefied. Includes here *H. roseum, H. rubrofuscum, H. polymorphum, H. liquefaciens.*

Helicobacterium: Miller, 1886.

Deut. med. Wchenschr., Berlin, 1886, p. 117. See also Miller's Wörterbuch d. Bacterienkunde, Stuttgart, 1886, p. 18.

H. aerogenes (Escherich) Miller.—Thin, motile rods, single or in chains, growing into long, wavy, bent threads, which may form spirals. Found in the human stomach.

H. klebsii (Escherich).—Cocci, rods, threads, etc., forming snake-like colonies, and of manifold forms. Found in guinea pig intestine.

Helicomonaden: Klebs, 1879.

Archiv. f. Exp. Path. u. Pharm., v. 10, 1879, pp. 161–218, 2 pls. A pleomorphic organism, consisting at times of short rods, arranged in more or less spiral form, and of granules; motile. The granules arise from the rods, which toward the end of a spiral series become shorter and shorter, finally appearing as small round bodies. As to their being micrococci he says "Die Möglichkeit dass dem so sei, lässt sich nicht ableugnen, doch wird es in diesem Falle nicht an der Auffindung weiterer Differenzen fehlen, welche uns gestatten werden, ein kürzestes Stäbchen, ein Brachbactron etwa, von einem Coccus zu unterscheiden." He thinks no spores are formed, and that longitudinal division occurs. The granules (körnchen) also form spiral-like masses. The rod form in culture forms "Bakterienballen." The cause of syphilis.

Helicomonas:

The name *Helicomonas syphiliticum* for the organism Klebs describes as above has been ascribed to Klebs, but in none of his publications have I found it. This name occurs in many German papers on this subject, and in Lipp. Med. Dict., Philadelphia, 1910, p. 411.

Helikobacterium: Escherich, 1886.

Münch. med. Woch., 1886, v. 33, p. 2. Characterized by its spiral colonies on gelatin plates. As the gelatin liquefies zoogloeae of spindle-shape are formed, which anastomose, covering the entire surface of the gelatin, and consisting of "swarming" bacteria, spirilla, and watch-spring-like threads. In older gelatin cultures round and elliptical forms in varied grouping are found (diplococci, tetrads, chains, etc.). He figures what he describes as "spirochäten" occurring in a milk culture of his *Helikobacterium.*

Species.—Thinks *Bacterium zopfii* Kurth belongs here and suggests the name *H. zopfii* for it. In one paragraph he writes his genus *Helikobacterium* (Klebs), probably referring to *Helicomonaden* Klebs.

Helikomonas: Escherich, 1886.

Münch. med. Woch., 1886, p. 2. *H. syphiliticum.* Variant of *Helicomonas.*

Helobacteria: Billroth, 1784.

Untersuchungen ü. die Vegetationsformen v. Coccobacteria Septica, Berlin, 1874, pp. 22, 23, Pl. IV. "Nail-like" bacteria. At one end of the rod is a highly refractive body which he concludes is a spore, the diameter of the spore greatly exceeding that of the rod.

Hemophilus: Winslow, Broadhurst, Buchanan et al, 1917.

J. Bact., v. 2, No. 5, Sept., 1917, p. 561. Family Bacteriaceae Cohn 1872 emended. Minute rod-shaped cells, nonmotile, without spores; strict parasites, growing best (or only) in the presence of hemoglobin, and in general requiring blood serum or ascitic fluid. Gram negative.

Type species (original designation).—*H. influenzae* (Pfeiffer), comb. nov.

Hillhousia: West and Griffiths, 1909.

Proc. Roy. Soc. Lond., Ser. B, Biol. Sci., v. 81, 1909, p. 398.

Type species (monotypy).—*H. mirabilis.* A sulfur bacterium of giant proportions—"the largest solitary bacterium which has so far been discovered." Average length about 60μ, and breadth about 26μ. Peritrichiate. Each individual contains a protoplasmic network in the wide meshes of which large globules of sulfur are located. The network includes numerous small granules, a considerable proportion of which consist of some nucleo-proteid (linin?). None of them are chromatin granules. Cell wall is firm and very resistant to reagents. Not homogeneous, and 5 per cent phenol demonstrates its lamellose character. Multiplication relatively slow, one division occupying about 24 hours. Transverse fission. Habitat: Stagnant pools and marshy bogs.

Hyalococcus: Schröter, 1886.

Krypt.-Flora v. Schlesien. Cohn. v. 3, pt. 1, Pilze. Breslau, 1885–1889, p. 152. Cells spherical or elliptical; single or in twos, rarely in series of 4 and 6. Capsule, sharply defined.

H. pneumoniae.—Syn. (Schröter) *Pneumococcus,* Friedlander 1882. Cells spherical or elliptical. Single or in two or more. Capsule rare in culture, but always present on organism from lung exudate.

H. beigelii (Küchenmeister and Rabenhorst).—Syn. (Schröter) *Pleurococcus beigelii* Küchenmeister and Rabenhorst 1867. Cells spherical with a mucilaginous capsule 3 to 4μ in diameter. Found on living hair, and hair cut from the heads of healthy persons.

Hydrogenomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1909, p. 311. Monotrichiate short rods, oxidizing hydrogen to water.

Type species (monotypy).—*Baccillus pantotrophus* Kaserer.

Hygrocrocis: Agardh, 1843.

Linneae, 1843, p. 82. An algal genus into which some species of bacteria were erroneously placed, e. g., *H. vandellii* Menenghini Syn. (Migula, Syst. d. Bakt., 2, 1900, p. 1041) *Beggiatoa alba* (Vaucher) Trevisan.

Hypnococcus: Bettencourt, Kopke, et al, 1904.

Revista Port. de Med. e Cir. Prat., v. 12, 1902, p. 291–299. See also Centralbl. f. Bakt., Abt. 1, v. 35, 1904, p. 45. In the earlier publication the organism is described as a "diplostreptococcus" and called "hypnococco." In 1904 they use the name *Hypnococcus:* A diplococcus, the elements rounded, sometimes one of the diameters slightly larger than the other, i. e., elliptical; arranged opposite each other much as the gonococcus.

Chains of 2, 3, 4, or more. The individual cells measure 0.7 to 0.8μ. Always nonmotile.

Hyphomicrobium: Stutzer and Hartleb, 1901.

Mitt. d. Land. Inst. Breslau, v. 1, Berlin, 1901, p. 76 and 107.

Type species (monotypy).—*H. vulgare*. A nitrifying (?) organism found in soil. Related to the bacteria and to the hyphomycetes. On nitrate agar, small homogeneous rods, with usually pointed ends, 0.6 to 0.8μ by 1 to 1.5μ long. Stained with phenol fuchsin a darker central body surrounded by a clear zone may be observed. Egg-shaped forms in older cultures, which send out threads, some of which show true branching. Multiplication also by transverse division. Found also in cement which they think was decomposing through the assistance of this organism.

Indiellopsis: Brumpt, 1913.

According to Chalmers and Christopherson: Ann. Trop. Med. and Parasitol., Liverpool, 1915, pp. 240–255. Brumpt classified the cause of certain mycetomas of the hand as *Indiella somaliensis* (1906). In 1913 he renamed this species *Discomyces somaliensis*, and in the same year created a new genus or subgenus for it: *Indiellopsis somaliensis*. Chalmers and Christopherson change its name to *Nocardia somaliensis* (Brumpt, 1906). Brumpt based his *Indiellopsis* on the fact that the species secreted around itself in the grain a hard sheath, insoluble in potash and eau de javelle, which no other *Nocardia* is known to do.

Indolococcus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1909, p. 340. A coccus characterized by indol production.

Iodococcus:

Variant of *Jodococcus* Miller.

Iodococcus:

Lipp. Med. Dict., Phila., 1910, p. 452. "A minute bacterial coccus found in the mouth, which gives a blue color with iodine."

Jodococcus: Miller, 1888.

Deut. med. Wchenschr., 1888, No. 30, p. 612. See also Die Mikroorg. der Mundhöhle, 1889, p. 60.

J. magnus.—Large cocci, in pairs, of varying size. Staining blue to violet with iodine. Does not grow on the ordinary media.

J. parvus.—A smaller micrococcus, giving the same color reactions with iodine.

Kakkecoccus: Okata and Kokubo, 1905.

J. of Milit. Surg. Assoc. (Japanese publication). From Philip. J. Sci. v. 1, 1906, p. 172. Usually occur as diplococci, but also singly or in groups. Stain irregularly. Not capsulated. Not motile. Cause of beriberi (Japanese "kakke"). Apparently not used in the generic sense.

Kalymmabacterium: Beaurefaire-Aragao and Vienna, 1912.

Brazil Med., July 22, 1912. Emended to *Calymmatobacterium* by same authors in 1913.

Karphococcus: Hohl, 1902.

Landw. Jahrb. d. Schweiz, v. 16, 1902, p. 342. See also Centralbl. f. Bakt., Abt. 2, v. 9, 1902, p. 338. Morphologically very much like *Micrococcus freudenreichii* Guillebeau, but somewhat smaller. Very different in its cultural characters, however.

Type species (*monotypy*)—*Kharphococcus pituitoparus*. Isolated from straw. Produces no indol in bouillon, but there is evolution of H_2S. Causes ropy milk. Average size 1μ. Grayish white on agar, no liquefaction of gelatin, no acid formed from milk.

Karphokokkus: Hohl, 1902.

Variant of Karphococcus. Spelled in this manner in title of paper in citation given under *Karphococcus.*

Keratophyton: Rosenhauch, 1908.

Klin. Monatsbl. Augenheilk. Stuttgart (46), N. F. 6, 1908, 514–522. Doubtful as to its position—belongs either with the bacteria or with the "schimmelpilzen." Varied form and size. Some of the rods are so short as to appear like cocci, many are somewhat longer, others again (young cultures) form very long, wave-like, at times branched threads. Here and there are thick, spindle-shaped or irregular drawn-out forms, which sometimes are filled with vacuoles. Many of the rods are similar to the bacilli of chicken cholera. The cause of corneal ulcers.

Kladothrix:

Many German writers. Variant of *Cladothrix.*

Klebsiella: Trevisan, 1885.

Atti della Accad. fisio-medico-Stat. in Milano, 4 ser., v. 3, 1885, p. 105. Bacilli and cocci. The bacilli are cylindrical, straight, inarticulate, hyaline, of two forms: macrobacilli and microbacilli; cytoplasm homogeneous. The cocci are derived from the microbacilli, and are in monilia-like chains or solitary. Capsulated. No spores.

Type species (monotypy)—*Bacterium pneumoniae-crouposae* Zopf which becomes *K. crouposa.*

Kokkobacillus: Biedert, 1885.

Virchow's Archiv., v. 100, Berlin, 1885, p. 439.

Type species (monotypy)—*K. zymogenes.* An organism closely related to the proteus group. Of varying form and size, rods, cocci, etc. In the longer rods are refractive granules. The coccus forms (produced by the rods) exhibit a trembling motion. Gelatin not liquefied.

Kokkobacteria: Klebs, 1887.

Die Allg. Path., Jena, 1887, p. 310. Variant of *Coccobacteria* Billroth.

Kokkothrix: Unna, 1887.

Dermatolog. Studien herausgegeb. v. Unna, Heft 4, Hamburg and Leipzig, 1887, pp. 29 and 58. Variant of *Coccothrix* Lutz.

Kokkus:

Many German writers. Variant of *Coccus.*

Kurthia: Trevisan, 1885.

Caratteri di Alcuni nuovi generi de Batteriaceae. In Atti della Accad. fisio-med.-statistica in Milano, ser. 4 v. 3, 1885, p. 92. Three stages of development: (1) Filaments; (2) bacilli; (3) cocci. The filaments (typical protoplasmic stage) are cylindric; at first apparently inarticulate, later articulate, not colored, irregularly spiral, radiating from a central point. Bacilli (transitory stage) are cylindrical, inarticulate, straight, uniform, grouped into irregularly rounded colonies. The cocci (final stage) are at first united, later free. Spores not known.

Type species (monotypy).—*K. zopfii* Kurth.

Lactobacillus: Beijerinck, 1901.

Arch. Néerl. des Sci. ex. et Natur., Sér. 2, v. 4, 1900–1901, pp. 9 and 212. Rod-shaped organisms producing active lactic acid (usually laevo). Ferment milk at a temperature of 30° C. Nonmotile. He includes here: *L. fermentum, L. delbrucki,* and later adds a number of others.

Lactobacillus (Beijerinck) emended Winslow, Broadhurst, Buchanan, Krumwiede, Rogers, and Smith, 1917.

J. Bact., v. 2, no. 5, Baltimore, 1917, p. 561. This committee placed the genus *Lactobacillus* under a new family—the *Lactobacillaceae*, characterized as below. Rods often long and slender, gram-positive, nonmotile, without endospores. Usually produce acid from carbohydrates, as a rule lactic. When gas is formed it is CO_2 without H_2. The organisms are usually somewhat thermophilic. As a rule microaerophilic. Surface growth on media poor. The generic characters those of family.

Type species (original designation).—*L. caucasicus* (Kern?) Beijerinck.

Lactobacter: Beijerinck, 1900 (?).

Centralbl. f. Bakt., abt. 2 v. 6, 1900, p. 200. See also Arch. Néerl. sér. 2, v. 4; 1900–01, p 9. A "natural genus." Aerobic rods, diplococci and micrococci, the "lactic ferments."

Lactococcus: Beijerinck, 1901.

Arch. Néerl. des. Sci. ex. et Nat., sér. 2, 1901, p. 212. Includes micrococci, diplococci and streptococi which at a temperature of 30° C. ferment milk with the production of lactic acid, usually the dextro acid.

Type species.—Lactococcus lactis (Leichmann).

Lactosarcina: Beijerinck, 1908.

Arch. Néerl. d. Sci. Ex. et Nat. sér. 2, v. 13, La Haye, 1908, p. 359. Found in distilleries, yeast factories, tanneries, etc. Produces active lactic acid. Nonmotile, nonsporulating, very resistant to drying. No catalase is ever formed.

Lamprocystis: Schröter, 1886.

Krypt.-Flora v. Schlesien, Cohn. v. 3, part 1, Pilze, 1885–1889, p. 151. Cells elliptical, at first in roundish solid heaps, later forming hollow sacks, in which the cells lie embedded in a slimy mass. Finally the membrane ruptures and becomes net-like.

Type species (monotypy).—*L. roseo-persicina Kützing.* Syn. (Schröter) *Microhaloa rosea* Kützing; *Protococcus rosea-persicina* Kützing 1849; *Pleurococcus roseopersicina* Rabenhorst; *Bacterium rubescens* Ray Lankester; *Clathrocystis rosea-persicina* Cohn, 1875.

Lampropedia: Schröter, 1886.

Same reference as for Lamprocystis, p. 151. Cells united in fours or more to form regular, flat tabular colonies, colorless or brightly colored (not green). Distinguished from *Merismopedia* Meyen only through lack of the green pigment.

Type species (monotypy).—*L. hyalina* (Ehrenberg, Kützing) Schröter. Cells spherical, colorless, about 2μ in diameter, 4 or several times 4 cells tabularly arranged, these plates reaching at times a diameter of 15μ. Habitat: In swampy water, etc.

Leptomitus: Agardh, 1824.

Syst. Algarum, 1824, p. 83. An algal genus into which some species of bacteria have been placed, e. g., according to De Toni and Trevisan (Sacc. Syllog. Fung. v. 8, 1889, p. 933) : *Leptomitus divergens* Kützing, is synonymous with *Leptotrichia rigidula* (Kützing) Trevisan.

Leptonema: Rabenhorst (?). An algal genus. According to Trevisan (Sacc. Syllog. Fung. v. 8, 1889, p. 934) *Leptonema nivea* Rabenhorst (Alg. Decad. p. 653) is synonymous with *Letotrichia nivea* (Rabenhorst) Trevisan, and *Thiothrix nivea* Winogradsky.

Leptospira: Noguchi, 1917.

J. Exp. Med., v. 25, No. 5, Baltimore, 1917, p. 755, and idem. v. 27, no. 5, 1918, p. 576 and 584.

Type species (monotypy).—*L. icterohaemorrhagiae* (Inada and Ido, 1914). Cause of infectious jaundice. Closely wound, 10 to 12 coils within 5μ, slender, cylindrical filaments with gradually tapering ends. Lengths 7 to 14μ; rarely 30 to 40μ; diam. 0.25 to 0.3μ. Spiral amplitude, 0.45 to 0.5μ. Spiral depth, 0.3μ regular. One or more gentle wavy curves throughout the entire length. In a free space one or both ends may be semicircularly hooked, while in semisolid media the organism appears serpentine, waved or bent. Flexible. No axial filament present; no chambered structure; no membrane; no crista; no flagellum; no terminal finely spiral filament; terminal or caudal (last 6 or 8 spirals) portion highly motile. Division transverse. Stains reddish violet by Giemsa's solution. Also places here *Spirochaeta biflexa* Wolbach and Binger. Noguchi considers this genus intermediate between the protozoa and bacteria. He later included the cause of yellow fever under this genus: *L. icteroides* Noguchi. See J. Exp. med. v. 29, 1919.

Leptothrix: Kützing, 1843.

Phycologia Generalis, Leipzig, 1843, p. 198. Trichomata simplicia tenuissima, monogonimica, turgida, continua, vel obsolete articulata, in stratum vel compactum, vel caespitosum, continuum, pleurumque late expansum complicata.

Type species (first in numerical order, and subsequent designation by many authors).—*L. ochracea* (Leiblein) Kützing; L. fluctuans, natans, ochracea; trichomatibus curvatis, intricatis, subtilissimis diameter $\frac{1}{1800}$ to $\frac{1}{1200}$ inch; articulis globosis vel oblongis.

Leptothrix: (Kützing) emend. Cohn, 1875.

Beit. z. Biol. d. Pflanzen, v. 1, h. 3, Breslau, 1875, p. 203. Cells arranged in unbranched threads; cylindric, colorless; very thin; long.

Leptothrix: (Kützing) em. Ellis,[1] 1907.

Cent. f. Bakt., Abt. 2, v. 19, 1907, p. 503.

Type species (monotypy).—*L. ochracea.* Usually associated with *Gallionella ferruginea.* A number of straight filaments free at both ends. The ends are often unsymmetrical. Membrane sharply contoured internally and externally. Breadth varies from 1.5 to 2μ, but when covered with ferric hydroxide often reaches 3μ, and more. Length reaches up to 200μ and possibly more. Formation of conidia takes place by a process of budding, constriction occurring as soon as the required length has been obtained. Sometimes the constriction is prolonged so that a number of quill-like structures are seen protruding from the organism. Eventually these are abstricted and elongate to form new threads. Conidia oval and 1μ by 1.5μ. Multiplication also occurs by cell division. At various unequal distances along both sides of the membrane small nodules are formed. Each nodule divides into two, the split taking place between the two daughter nodules. As the pairs of nodules are not exactly opposite the pairs on the other side of the membrane the daughter cells are not symmetrical at the ends. Nonmotile at all stages.

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[1] Ellis (Cent. f. Bakt., Abt. 2, v. 26, 1910. p. 324) makes the important observation that the iron bacteria may be classified according to the following scheme: Group 1. Those which reproduce by external abstriction of conidia: *Leptothrix ochracea, Gallionella ferruginea,* and *Spirophyllum ferruginea.* Group 2. Those which reproduce by the separation of internally produced cells: *Crenothrix polyspora, Cladothrix dichotoma,* and *Clonothrix fusca.* In addition he had earlier (Cent. f. Bakt., Abt. 2, v. 19, 1907), made the distinction that *Leptothrix* and *Gallionella* possessed cylindrical threads, while his two genera *Nodofolium* and *Spirophyllum* were flattened bands. All of these genera he considers as belonging to the thread bacteria.

Leptothrix: (Kützing) emend. Buchanan, 1918.

J. Bact., v. 3, no. 2, Balto., 1918, p. 303. Filaments of colorless cells, with a sheath at first thin and colorless, later thicker, yellow or brown, becoming encrusted with iron oxide. Multiplication through division and abstriction of cells and motile cylindric swarm cells. Swarm cells sometimes germinate in the sheath giving the appearance of branching. Pseudodichotomous branching may occur.

Type species (original designation).—*L. ochracea* (Leiblein) Kützing. (Note.—Buchanan states that this conception of *Leptothrix* renders the genus represented by *Leptothrix buccalis* invalid.)

Leptothrix: Robin, 1847.

Des vegetaux qui croissent sur les animaux vivants. Paris, 1847, p. 42. According to Hist. nat. des. Végét. Paras, etc., Paris, 1853, p. 345. *L. buccalis* Robin.—Trichomatibus, rigidulis, linearibus, rectis, vel inflexis non moniliaformibus, achromaticis, extremitatibus obtusis, basi in stromate amorpho granuloso adhaerentibus. Length, 0.02 mm. to 0.1 mm.; breadth, 0.0005 mm. Habitat: In superficie linguae, inervallis dentium, cavo dentium corruptorum, et in succis stomachi et intestini.

Leptotrichia: Trevisan, 1879.

Rend. Reale Ist. Lombardo, Ser. 2, v. 12, 1879, p. 138. Somatia cylindrica, plus minus distincte articulata, tenuia, elongata, filiformia, recta, laxe, fasciculata. In Trevisan's original paper he named no species.

Leptotrichia: (Trevisan) em. Committee Soc. Am. Bact., 1917.

J. Bact., v. 2, 1917, p. 206. Thick, long, straight or curved threads, frequently clubbed at one end and tapering at the other. Gram positive when young. Nonmotile. Filaments sometimes granular; non-branching. No aerial hyphae or conidia. Parasites or facultative parasites.

Type species (original designation).—*L. buccalis* (Robin) Trevisan.

Leptotrichiella: Trevisan, 1889.

Sacc. Syllog. Fung., v. 8, 1889, p. 935. A subgenus of *Leptotrichia*.

Leucocystis: Schröter, 1883.

According to Schröter: Krypt.-Flora v. Schlesien. Cohn. v. 3, pt. 1, 1885–1889, p. 152. Cells spherical or short elliptical, single or several united by a large, several layered plainly contoured, gelatinous membrane, and flowing together into slimy masses.

Type species (monotypy).—*L. cellaris* Schröter. Syn. (Schröter) *Erebonema hercynicum* (Kützing). Cells spherical or short elliptical, 1.5 to 2μ long by 1 to 1.5μ broad, strongly light refracting. Found in cellars, etc. Schröter later (Ber. u. d. Thät. bot. Sec. d. Schles. Gessellsch., 1883, p. 197) included Friedlander's *coccus* here as *L. pneumoniae*.

Leuconostoc: Van Tieghem, 1878.[1]

Annales d. Sci. Nat. Bot., v. 7, Paris, 1878, p. 198, pl. 16. Cellulae achromaticae minimae globosae, in catenas laxas flexuoso-curvatas et implicatus, vagina gelatinoso-cartilaginea lobata crassissima circumdatas, consociatae. Vaginae in thallum gelatinoso-cartilagineum, subglobosum, vel crassissime membranaceum, irregulariter expansum, extus cerebroideum, intus pseudo-parenchymaticum aggregatae. Sporae singulae, globosae, majores, terminales vel interstitiales pachydermaticae, intus homogenea.

Type species (monotypy)—*Ascococcus mesenterioides* Cienkowski, found in cane sugar solutions.

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[1] See emend. by Com. Soc. Am. Bact. (in J. Bact.; v. 5, 1920, p. 206): Saprophytes; cells in chains, or pairs united in large zoogleal masses. Same type.

Leucothrix: Örsted, 1844.

De regionibus marinis, p. 44. According to Saccardo's Sylloge Fung., v. 8, 1889, p. 933. *L. mucor*, synonymous with *Leptotrichia mucor* (Oersted) Trevisan. Trevisan makes this genus a subgenus of his *Leptotrichia.*

Lineola: von Baer, 1827.

Nova Acta Phys.-Med. Acad. Caes. Laop. Nat. Cur., v. 13, 1827, p. 748. Löffler and other early writers express the belief that von Baer included bacteria under this name. "Die Reihe für die Thiere des Typus mit vorherrschender Längendimension beginnt mit lebendigen Fäden; *Lineola* (so mögen die einfachsten Vibrionen heissen), repräsentirt sie unter den Protozoen. Auf der ersten Entwickelungstufe werden sie zu lebendigen Röhren mit Keimen, Vibrio," etc.

Lipobacter: Kruyff, 1907.

Bull. de Dept. de l'Agricult. aux Indes Néerl. No. 9 (Micro-biol. 3), Buitenzorg, 1907, pp. 1–13. Motile or nonmotile rods, or cocci, which oxidize and hydrolyze fats. Obtained from soil, river water, sewage water, rancid butter, and in the excrement of various animals. Oxidize free fatty acids of high molecular weight. Describes several species, calling them *Lipobacter* 1, 2, 3, etc. *Lipobacter* 9=*Bact. fluorescens liquefaciens.*

Liquidobacterium: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 338. Spore-free, peritrichiate rods; aerobic; liquefying gelatin—the *Proteus* group.

Species.—L. prodigiosum (Ehrenberg, 1839); *L. vulgare* (Hauser).

Liquidococcus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 332. Polar flagellate cocci, liquefying gelatin.

Liquidomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 332. Polar flagellate, obligate aerobes; fluorescent and dentrifying.

Species.—Bact. fluorescens liquefaciens L. fluorescens; L. pyocyanea; L. schirokikki (Cent. f. Bakt., Abt. 2, v. 2, 1896, p. 205).

Liquidovibrio: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 333. Polar flagellate vibrios, liquefying gelatin. Frequently luminous.

Type species (monotypy).—*Vibrio cholerae.*

Macrococcus:

Found frequently in literature, but not used in a generic sense. See Lipp. Med. Dict., Philadelphia, 1910, p. 524.

Madurella: Brumpt, 1905.

Compt. Rend. de la Soc. de Biol., v. 1, Paris, 1905, p. 997. Brumpt defined this genus as belonging to the Mucedinaceae; type species *Streptothrix mycetomi* (Laveran).

Makrokokkus: Miller, 1892.

Mikroorg. d. Mundhöhle, 1892, Ed. 2, p. 73. Variant of *Macrococcus.*

Mantegazzaea: Trevisan, 1879.

Rend. Reale Istit. Lombardo. ser. 2. v. 12, 1879, p. 137. See Saccardo's Syllog. Fung. v. 8, 1889, p. 942. Somatia fusiformia vel cylindrica, distincte articulata, valida, abbreviata. recta, segregata. Sporae ignotae. Divisione transversali sese multiplicantes.

Species *M. cienkowskii.* Baculis fusiformibus, apicibus acutis, achrois, immobilibus, 4 to 5.5μ to 2 to 2.5μ. *M. articulata* (*Bact. articulatum* and *Bact. triloculare* Ehrenberg).

Mantegazzaea: Trevisan emend. Vuillemin, 1913.

Ann. Mycol v. 11, Berlin, 1913, p. 521. A " formogenre " characterized by fusiform elements.

Type species (original designation).—*M. hastilis* (*Bacillus hastilis*) Seitz, 1889. It is the " Bacille fusiforme des medecins." See *Fusiformis* Hoelling.

Mastichemonas: Diesing, 1850.

Systema Helminthum, v. 1, Vindobonae, 1850, p. 22. A sub-genus of *Monas*. Animalcula solitaria libera. Corpus ecaudatum, elongatum, subglobosum, ovatum, turgidum, v. planum, haud v. mollitie sua solum mutabile, divisione spontanea simplici perfecta bipartitum v. indivisum. Os terminale. Flagellum simplex. Ocellus nullus. Est Parenema (Euparenema) corpore haud mutabile. Includes under this subgenus 22 species: *Monas* (*Mastichemonas*) *termo* Müller (Ehrenberg), *M.* (*Mastichemonas*) *punctum*, *M.* (*M.*) *lens*, *M.* (*M.*) *okenii*, etc.

Megabacteria: Billroth, 1874.

Untersuchungen über die Vegetationsformen v. Coccobacteria septica, Berlin, 1874, p. 16. Pl. 4, fig. 29. Large rods, occurring singly or in pairs.

Megabacterium: Lipp. Med. Dict., Phila., 1910, p. 544.

Megacoccos: Billroth, 1874.

Same citation as for Megabacteria, p. 6. The largest of the coccos forms. This form " passes over " into the smaller form.

Megacoccus: Miller, 1886.

Syn. (Miller), *Macrococcus.* Wörterbuch d. Bacterienkunde, Stuttgart, 1886, p. 23.

Megalothrix: Schwers, 1912.

Centralbl. f. Bakt., Abt. 2, v. 33, 1912, p. 273, 5 pls. Thread forms belonging to the iron bacteria.

Type species (monotypy).—*M. discophora.*[1] Threads 300μ long, and 8 to 12μ wide, which contain longish cells. Distinguished from *Leptothrix* by the possession always of a delicate sharply defined canal, and a very wide, homogeneous or very finely granular, gray, bright yellow or bright orange sheath, whose circumference decreases gradually toward one end of the thread; dichotomy rare; seldom possible, because of thickness of sheath, to observe the division of the threads into the long cells.

Melanella: Bory de St. Vincent, 1824.

Encyclopedia Methodique (Zooph.) 1824, pp. 46 and 511. See also Essai d'une Classif. des Animaux Microscopiques. Bory de St. Vincent, Paris, 1825, p. 18, and Dict. Class. d'Hist. Nat., Paris, June, 1826, v. 10, pp. 517 and 533. " Miscroscopiques " beonging to the order Gymnodes, and to the family Vibrionides. They are deprived of all appendages, are linear or needlelike; have an opaque body not rolled into a discoidal spiral. No definite motility observed—a sort of vibration described. Found frequently in emulsions of muscle, macerated human testicle (*Melanella spirillum*), fermented urine, sea water, etc. He included here: *M. atoma* Bory de St. Vincent. [Syn. (Ehrenberg) *Vibrio lineola* Müller]; *M. monadina*, *M. punctum* Müller; *M. flexuosa* (*V. rugula* Müller); *M. spirillum* (*Vibrio spirillum* Müller). Vuillemin (Ann. Mycol. v. 11, Berlin, 1913, p. 578) says

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[1] Synonymous (according to Ellis in Cent. f. Bakt., Abt. 2, v. 44, 1913, p. 449) with *Leptothrix meyeri* Ellis, which Ellis decided later to be merely a peculiar mucilaginous development of a *Crenothrix* thread.

it is believed that the type of this genus (*M. monadina* Bory, 1824) is identical with *Monas punctum* Müller 1786. His own opinion is that this is problematical, but that the species might be *Bacterium punctum* Ehrenberg, 1830 (*Bacillus punctum* Trevisan, 1889). He rejects it as a valid genus.

Melococcus: Nedrigailov, 1907.

Charkov. Med. Zurn., v. 4, No. 9, Charkov, 1907, p. 301. See also Amiradzibi, p. 309.

Type species (monotypy).—*M. ostrajanini.* A small gram-positive coccus, occurring sometimes in small chains or clusters. Found in the intestinal tract of *Galleria melonella* (bee moth), but not pathogenic to this insect even when it is fed upon it, but pathogenic to man.

Meloseira (Melosira) Agardh, 1824. Syst. Alg., 1824, p. 8. A diatom genus into which species of bacteria have been erroneously placed, e. g., *M. minutula* Brébisson Syn. (Trevisan, Sacc. Sylloge, Fungorum, v. 8, 1889, p. 1007) *Spirillum ferrugineum* (*Gallionella ferruginea* Ehrenberg).

Meningococcus: Foà and Bordono-Uffreduzzi, 1888.

Ztschr. f. Hyg., v. 4, 1888, p. 67.

NOTE.—A search through several hundred papers on the organism causing cerebro-spinal meningitis makes it rather probable that these authors were the first to use the term "meningococcus." So many papers were published in the same year, however, and in the majority of cases the exact time of the year is not stated, so that it is impossible to be very certain in this case. They merely used it as a designation for the organism they had studied, and did not define it as a genus, naming no species. They considered their organism identical with the "Pneumococcus," causing croupous pneumonia as well as spinal meningitis. So they conclude that "könnte der fragliche Mikroorganismus allgemein mit *Diplococcus lanceolatus* oder *capsulatus* bezeichnet werden, da sein Hauptmerkmal das ist, dass er Diplococcus ist, eine kleine Lanze bildend, und mit Kapseln versehen. Zu diesen Namen könnte man dann noch, je nach den Fallen Pneumoniae, sive Menigitis cerebro-spinalis u. s. w. hinzusetzen." See *Meningokokkus* Huebner, 1896.

Meningococcus: Coats and Forbes, 1911.

M. intracellularis. Proc. R. Med. Soc., v. 4, 1911, p. 242.

Meningococcus:

M. intracellularis (Weichselbaum) Kraus, 1913. Hand. d. Path. Org. Kolle & Wassermann, v. 2, Jena, 1913, p. 783.

Meningokokkus: Huebner, 1896.

Jahrb. f. Kinderheilk., n. f., v. 43, 1896, p. 3. Renames the organism described by Weichselbaum as the cause of spinal meningitis under the name *Diplococcus intracellularis meningitidis: Meningokokkus intracellularis* "wie der Organismus wohl am Besten—zum Unterschiede vom Pneumokokkus—genannt wird."

Merismopedia: Meyen, 1828.

Nova Acta Naturae Cur., v. 14, Bonn, 1828–29, p. 771. See also Archiv. f. Naturgeschichte (Wiegmann), Berlin, 1839, v. 2, p. 67.

Species.—*M. punctata.* Meyen defined this genus as a phycochromaceous alga. Rabenhorst (Flora Europea Alg., Sect. 1–2, 1864–65, p. 58) places *Sarcina ventriculi* Goodsir here.

Merismopedium: Caspary, 1874.

Schriften d. Physikal.—Ökonomischen Gesell. z. Königsb. v. 14–16, 1873–1875, p. 104. *M. reitenbachii*, n. sp. Describes an alga under this name, stating that Meyen, Rabenhorst, Kützing, et al, were incorrectly writing Merismopedia.

Merismopedia: Zopf, 1885.

Die Spaltpilze, Zopf. Breslau, 1885, pp. 51 and 54. Cocci, consisting of spherical elements arranged in plates. Division in two directions, leading to the formation of cell layers in platelike arrangement.

Type species (monotypy).—*M. gonorrhoeae*. The cause of gonorrhoea; 0.83μ in diameter.

Merista: Banks and Soland in Mss. 1769.

According to Cunningham (Ann. Nat. History. v. 10, B. II, London, 1839, p. 47). *Merista laevigata* Banks and Soland is syn. with *Myrsine urvillei*, one of the higher plants.

Merista: Van Tieghem, 1884.

Traité de Botanique, Paris, 1884, p. 1114. "Bactériées," dividing in 2 directions, membraneous body, dissociating into tetrads, as they divide.

Merista: Prazmowski, 1888.

Verh. d. k. k. Akad. d. Wissensch. in Krakau. Math.-Nat. Sekt., v. 18, 1888, p. 235. See also Bot. Cent., v. 36, 1888, p. 259.

Type species.—*M. ureae* (Cohn).

Mesobacteria: Billroth, 1874.

Same reference as for *Megabacteria*, p. 6. Pl. IV, fig. 28. Average-sized rods. Following Hoffmann.

Mesococcos: Billroth, 1874.

Same reference as for *Megabacteria*, p. 6. Pl. 1, fig. 3. Medium-sized form of Micrococcos. Motile and nonmotile. See *Coccobacteria*.

Mesococcus: Miller, 1886.

Wörterbuch d. Bacterienkunde, Stuttgart, 1886, p. 23. A medium sized coccus.

Metabacterium: Chatton and Pérard, 1913.

Compt. Rend. Soc. Biol., v. 74, Paris, 1913, p. 1232.

Type species (monotypy).—*M. polyspora* n. sp. Found in the caecum of the guinea pig. Characterized by its ability to form from 1 to 8 spores in a single cell. A truncated spindle-shaped organism, always single, 10 to 25μ long by 5μ wide. Nonmotile. Cytoplasm condensed into chromatic masses, from which the spores develop, which (when limited to 2) are usually bipolar. The vegetative forms have never been observed to divide. Nonpathogenic.

Metacoccus: Conn, 1909.

Agricultural Bacteriology, Conn. 1909, Ed. 2, p. 12.

Metallacter: Perty, 1852.

Zur Kenntniss der kleinster Lebensformen. Perty. Bern, 1852, p. 180. "Bacteria-like" individuals, which lengthen by division to rigid or slightly flexible threads which under certain conditions lose their motility. The threads are colorless or gray.

Type species (monotypy).—*M. bacillus* Müller. Vuillemin (Ann. Mycol. v. 11, 1913, p. 519) states that this genus is synonymous with *Serratia* Bizio.

Methanomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 311. Monotrichiate short rods, capable of oxidizing methane to carbon dioxide and water.

Type species (monotypy).—*Bacillus methanicus* Söhngren.

Microbacillus: (Sabouraud) Schamberg, 1902.

Zurn. dermatol, sifilidol., St. Petersburg, v. 2, 1902, p. 293. According to Int. Cat. Sci. Lit., R., Bact., v. 3, London, 1905, p. 247. *M. seborrhoeae*.

Microbacteria: Billroth, 1874.

Same reference as for *Megabacteria*, p. 6. Pl. 4, fig. 27. Small rods, some of them with clubbed ends. Appear to result from the stretching of the previously described *Mesococcos;* club-shaped ends perhaps resting spores. Motile. From spoiled milk. See *Coccobacteria.*

Microbacterium:

Cited by Smith in Bacteria in Rel. to Plant Dis., v. 1, Carnegie Inst., Washington, D. C., 1905, p. 174.

Micrococcos: Billroth, 1874.

Reference same as for *Megabacteria*, p. 6, pl. 1, fig. 2. The smallest form of coccos. Thinks they may be produced from resting spores, and that they enlarge giving rise to *Mesococcos* and *Megacoccos.* See *Coccobacteria.*

Micrococcus: Hallier, 1867 (?).

Bot. Zeitung, v. 23, 1865, p. 144. See also Gährungscheinungen. Unters. über Gährung, etc., Leipz., 1867, p. 108, and Paras. Unters. auf die Pflanzl. Oreg., etc., Leipzig, 1868, p. 67. In the earlier reference he described the "hefe" cells which he in 1867 called *Micrococcus.* "Die ganze bisher aufgefundene Metamorphose des Plasmakerne und Schwarmer lässt drei verschiedene Stufen erkennen. Die erste Stufe bildet die Kernhefe, man könnte sie als *Protococcus* bezeichnen, wäre nicht dieses Ausdruck zu allgemein auf eine Algengruppe angewendt. Ich schlage daher die Bezeichnung *Micrococcus* vor. Der Micrococcus (deutsch Kernzellen oder Kernhefe), die Hefe der Fäulniss, Gallussäure-gährung, Umwandlung der Starke u. s. w. entseht aus schwärmender oder ruhenden Kernen, welche ohne Membran einen so fort freiwerdenen Tochterkern abschnüren. * * * Die Leptothrix-Ketten sind * * * nur Kerne welche im Zusammenhang bleiben in Folge des Einflusses der Luft, also unvolkommene Kernehefe, man könnte sagen: *Oidium micrococci.*" From this it may be seen that Hallier gave no definition of the term. Some of his figures indicate that he had species of micrococci under study. In another paragraph in second reference given, p. 4, he speaks of *Micrococcus* as the smallest and simplest "Hefeform." See also Das Cholera Contagium. Bot. Untersuch. Aerzten und Nat. Leipzig, 1867, where he discusses his "cholera *Micrococcus.*" In many paragraphs in these references Hallier points out what he thought to be the transformation of his *Micrococcus* into the Mucoraceae and Ustilaginaceae.

Micrococcus: (Hallier) emend. Cohn, 1872.

Beitr. z. Biol. d. Pflanzen, v. 1, Heft 2, Breslau, 1870–1875, p. 151. Cells colorless or delicately colored; very small, spherical, or oval; forming through cross-division two or several-membered rosary-like chains (mycothrix, torula-form), or united into many-celled families (colonies, balls, heaps), or slime-masses (zoogloeae-form, Mycoderma-form). Includes here: *M. prodigiosus*, Syn. (Cohn) *Monas prodigiosa* Ehrenberg; *Palmella prodigiosa* Montagne; *Bacteridium prodigiosum* Schröter, *M. aurantiacus*, *M. chlorinus*, etc.

Micrococcus (Hallier, Cohn) em. Winslow and Rogers, 1905.

Science, n. s., v. 21, 1905, p. 559. See also J. Inf. Dis., 1906, v. 3, p. 485; The systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908, and Biol. Studies by the Pupils of W. T. Sedgwick, Boston, June, 1906, p. 205. Facultative parasites or saprophytes. Cells in plates or irregullar masses (never in long chains or packets). Generally decolorize by Gram. Growth on agar abundant, with formation of yellow pigment. Dextrose broth slightly acid, lactose broth generally neutral. Gelatin frequently liquefied. Nitrates may or may not be reduced. They include here: *M. orbicularus* Ravenel, *M. luteus* (Schröter) Cohn, and *M. ochraceus*, Rosenthal.

Type species (subsequent designation by Buchanan, J. Inf. Dis., v. 17, No. 3, 1915, p. 536).—*M. luteus* (Schröter) Cohn.

Microhaloa: Kützing, 1848.

Phycol. Generalis, p. 169. An algal genus. *M. rosea* Kützing (Linnea, v. 8, p. 341), according to Cohn and Migula is synonymous with *Lamprocystis roseopersicina* (Cohn) Schröter.

Micromyces: Gruber, 1891.

Münch. med. Woch., 1891, p. 653. See also Arch. f. Hyg., v. 16, Munich, 1893, p. 35. Defined it as a hyphomycete. Lehmann and Neumann (Bact., v. 2, Weaver's Trans., Philadelphia, 1901, p. 447) say it is synonymous with *Actinomyces*. In very young cultures cells appear as short rods less than 1μ in diameter, somewhat longer. The rods are frequently curved and knotted. These thickenings represent the beginning of branching. Branching continues until brush-like masses occur at the ends of the rods. Tendency toward fragmentation characteristic. The old mycelium often has the appearance of coccus chains. Fructification not observed.

Type species.—*Micromyces hoffmanni.* (Spelled also "*Mikromyces*" in text.)

Micromyces: Dangeard, 1888.

Le Botaniste, v. 1, 1888, p. 55. A phycomycetous fungus.

Microsphaera: Cohn, 1872.

Virchow's Arch. f. Path. Anat. u. Phys., v. 55, Berlin, 1872, p. 229. Spherical bacteria. Cells colorless, very small, spherical or spheriodal. Nonmotile usually. In chains of 2, 4 or 8, or in irregular groups or colonies, or in slime-masses (zoogloeae). Resting spores are formed (?)

Type species (monotypy).—*M. vaccinae.* Found in "Pockenlymph."

NOTE.—Cohn (Beitr. z. Biol. d. Pflanz. 1, Heft 2, 1870–1875) states later that he overlooked *Microsphaera* Léveillé 1851 (an epiphytic fungus), and so in order not to use the same name, adopts Hallier's *Micrococcus*.

Microspira: Schröter, 1886.

Kryptogamen-Flora v. Schles. Cohn, v. 3, pt. 1, Pilze, 1885–1889, p. 168. Vegetative cells slightly curved (comma-like), usually with only a half spiral, actively motile by means of 1 wavy polar flagellum (rarely 2 or 3). Single or several united, when screw-like or Spirochaete-like threads are formed. Spores are formed through division of members of the chains (arthrospores).

Species.—*M. comma.* Syn. (Schröter) the "comma-bacillus" of Koch, 1884. Habitat: In the alimentary tract causing Asiatic cholera. *M. finckleri* (Koch, 1884), and *M. buccalis* (Lewis, 1884).

Microspira (Schröter) em. Migula, 1894.

Arb. aus d. Bact. Inst. d. Tech. Hoch. z. Karlsruhe, v. 1, h. 2, 1894, Karlsruhe, 1897, p. 237. Rigid cells with 1, rarely 2 to 3 polar flagella, which are wavy, bent.

Type species (monotypy).—*M. comma* Schröter.

Microspironema: Stiles and Pfender, Dec. 2, 1905.

American Med., v. 10, Philadelphia, 1905, p. 936. Follow Vuillemin's objections to the generic name *Spirochaeta* Ehrenberg (*Spirochaete* used by Schaudinn) for the organism causing syphilis. Because of Vuillemin's generic name being preoccupied (Meeks, 1864), they propose *Microspironema.*

Type species (original designation).—*M. pallidum* (Schaudinn, 1905).

Microspora: Beijerinck.

Variant of *Microspira* Schröter. *M. tyrosinatica.*

Microsporon: Klebs, 1871.

Correspondenz-blatt f. Schweiz. Aerz., No. 9, Sept. 1, 1871, Bern, p. 241. *M. septicum.* Mycelial-like threads similar to *Leptothrix buccalis* distinguished from it through the exceeding fineness of the threads, which form thick brush-like masses in the destroyed tissues. On the upper surface of these brushes there develops a tough layer of very small spores. Habitat: Infected wounds.

Microzyma: Béchamp, 1867.

Compt. Rend. d. Sci. de l'Acad., v. 64, Paris, 1867, p. 231. A "vibrion"; "corpuscule vibrant." Division in two directions. The division in direction of its long axis is first evident as a black line, which later becomes granular. Just prior to division some of the forms are 2 to 3 times normal diameter. Under the influence of creosote the cells elongate and swell up to 2 or 3 times normal size and transverse division is observed. Mycelial-like threads sometimes formed. Motile. Inverts sugar with production of alcohol, acetic acid or one of its homologues, and a nonvolatile acid.

Species.—*M. cretae, M. bombycis.* Cause of "pébrine" in silk worms.

Mikrococcus: Unna, 1889, and numerous German writers.

Variant of *Micrococcus.* Monats. f. Prakt. Dermatol. Unna., v. 9, Leipzig, 1889, p. 393. *M. ulceris* (de Luca).

Mikrokokkus: Hueppe, 1885.

Die Formen d. Bakt., Hueppe. Lepzig, 1885, p. 148. Cocci, arranged in irregular heaps, without definite grouping.

Mikromyces: Gruber, 1891.

M. hofmanni Gruber. Variant of *Micromyces* Gruber.

Mikrospironema: Gonder, 1914.

Handb. d. Path. Protoz., Prowazek, 6 Lief., Leipzig, 1914, p. 690. Variant of *Microspironema.*

Modderula: Frenzel, 1897.

Biol. Centralb. v. 17, No. 22, Nov. 15, 1897, p. 801. Cells ellipsoid, surrounded by a strong membrane; contain small, round granules (sulfur?), and larger particles occasionally. Somewhat motile. No flagella stained. 12μ by 9μ to 50μ by 30μ.

Type species (monotypy).—*M. hartwigi.* Syn. (Migula, Syst. d. Bakt., v. 2, 1900, p. 1037) *Achromatium oxaliferum* Schewiakoff. See also Lauterborn, Biol. Centralbl., v. 18, 1898, No. 3.

Monobacteria: Billroth, 1874.

Reference as for *Megabacteria,* p. 16. Fine rods, occurring singly.

Monococcos: Billroth, 1874.

Reference as for *Megabacteria,* pp. 5 and 244. A *Megacoccus* occurring singly—single spherules.

Monas: Müller, 1773.

Vermium terrestrium et fluviatilium. Havniae, 1773, part 1, p. 25. See also Animalcula Infusoria Fluviatilia et Marina, Havniae, 1786, p. 1, pl 1.[1] Vermis inconspicuus, simplicissimus, pellucidus, punctiformis. Placed the genus under the group of *Infusoria crassiuscula.*—Infusors with no external organs.

Type species.—M. termo.[2] Animalculum omnium, quae microscopium simplex offert, minimum, simplicissimum, punctulum, gelatinosae, substantiae pisum microscopium composirum eludere videtur, dum ne quidem sub hoc distinctius appareat. Sphaericum, an orbiculare? haud video. Guttula aquae, in qua maceratio facta est, his corpusculis adeo saepe repletur, ut ne minium vacuum distingui liceat, ipsamque aqae substantium in aliam minus hyalinam, globularum ex punctis confertissimis, omnem calculum superantibus mutatam crederes. In hac massa motus, qualem radii folares in aqua micantes effingere folent, oculis exhibetetur, dum animalcula, examinis apum instar, vehementer commoventur. In infusione vegetabilium et animalium. Hujus guttula jam intra viginti quatuor horas conspicitur quasi massa globularis, at nullus in a motus nec odor percipitur, brevi vero motus fermentatio cum foetore intolerabili insequitur, at non in omni.

M. punctum, M. atomus, M. ocellus, M. hyalina, etc.

Monas lens, and *M. mica.* Later (1786) he included *M. punctum, M. atomus, M. ocellus, M. hyalina*, etc.

Monas (Müller) emend. Ehrenberg, 1828, 1838.

Symbolae physicae seu Icones et Descript. Animalium Evertebratorum, etc. (Decas Prima, Berolini ex Officina Academica, 1828, Phytozoa, p. 17, pl. 1, fig. 6, See also Die Infusionsthierchen, etc. Leipzig, 1838, p. 11. Family Monadina. *M. inanis, M. simplex*, etc. In the reference last given he further characterizes the genus, and describes the species *M. crepusculum*, which Cohn (Beit. z. Biol. d. Pflanz., v. 1, Breslau, 1875, p. 160) renames *Micrococcus crepusculum.*

Monococcus: Miller, 1886.

Wörterbuch. d. Bacterienkunde, Stuttgart, 1886, p. 27. Syn. *Micrococcus.*

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[1] On this plate both cocci and rods are shown.

[2] See Stiles, Bull. 24, Hyg. Lab., Treas. Dept., U. S. Public Health Service, Washington, 1905, p. 30, where he gives the following history of the three species first described by Müller:

1. *Monas termo* Müller, 1773. * * * Ehrenberg, 1830–1832, claims to have recognized this same species, adopting the name *Monas termo* (Müller) but later authors (Dujardin, 1841, p. 212; Diesing, 1850, pp. 16, 28) consider Ehrenberg's form distinct. Ehrenberg, 1832, p. 70, also mentions a "*Bacterium? termo.*"

Dujardin, 1841, p. 212, transferred "*Monas termo* Muller, non-Ehrenberg" to *Bacterium* as *Bacterium termo* (Müller) Dujardin, and the species is retained here in Diesing, 1850, p. 16.

Migula, 1897, states that *Monas termo* Müller can with some certainty be viewed as belonging to the bacteria; Cohn (1872) accepts *Bacterium termo* (as limited by Dujardin) as one of the two species of the genus *Bacterium* as emended by him.

2. *Monas lens* Müller, 1773. Retained in *Monas* by Dujardin, 1841; placed in subgenus *Mastichemonas* by Diesing, 1850. Migula, 1897, thinks this species belongs to the bacteria.

3. *Monas mica* Müller, 1773. Retained in *Eumonas* (typical subgenus of *Monas*) by Diesing, 1850. This species is thus seen to be type of the genus *Monas* by elimination, and as limited by Diesing, 1850.

Morococcus: Lipp. Med. Dict., Philadelphia, 1910, p. 581.
A coccus found in eczematous skin.

Mycobacillus: Chantemesse, Matruchot, and Grimberg, 1917.
Compt. Rend. d. Sci. de l'Acad. de Paris, v. 164, 1917, p. 652.

Type species (monotypy).—*M. synovialis.* Intermediate between the "micromycetes" and true bacilli, hence the name. Young cultures actively motile. Rod-like organism. Spores by "enkystement partiel." The older filamentous growths lose their motility. Certain portions of the filaments are gram-positive, others gram-negative. Isolated from cerebral ventricle in case of acute arthritis.

Mycobacterium: Lehmann and Neumann, 1896.
Atlas u. Grund. d. Bakt. v. 2, 1896, p. 367. According to Atlas and Principles of Bact., Weaver's trans., Phila., 1901, pp. 128 and 410. Thin, slender rods, often with typical dichotomous branching, sometimes forming unbranched threads. Irregular or club-shaped forms rare in culture, more frequent in tissues. Acid fast. Cultures dry and wrinkled.

Type species (first in order of arrangement).—*Bacillus tuberculosis* (Koch) Lehmann and Neumann.

Mycoderma: Persoon, 1822.
Mycologia Europaea, Sectio prima, Persoon, 1822, p. 96. Orbiculare coriiforme, primo molle, subpellucidum dein induratum, substantia ubique aequali.

Type species (first in order of arrangement, and subsequent designation by many authors).—*M. ollare.*

Mycoderma: Thomsen, 1852.
M. aceti. According to Migula (Die Syst. d. Bakt., v. 2, 1900, p. 400), who says the species is synonymous with *Bacterium aceti* (Kützing) Zopf.

Mycoderma: (Persoon) emended Committee, Soc. Am. Bact., 1917.
J. Bact., v. 2, No. 5, Baltimore, 1917, p. 551. Cells rod-shaped, frequently in chains, nonmotile; cells grow usually on the surface of alcoholic solutions, securing growth energy by the oxidation of alcohol to acetic acid. Also capable of utilizing other carbonaceous compounds, as sugar and acetic acid. Elongated, filamentous, club-shaped, swollen and even branched cells common and quite characteristic.

Type species (original designation).—*M. aceti* Thompson (?).

Mycomonas: Jensen, 1909.
Centralbl. f. Bakt., Abt. 2, v. 22, Jena, 1908–9, p. 329. Renames the genus *Mycobacterium* Lehmann & Neumann.

Myconostoc: Cohn, 1873.
Ber. u. die Thät. d. bot. Sect. d. Schles. Gessellsch., 1873, p. 45. See also Beit. z. Biol. d. Pflanzen. Cohn., v. 1, Heft 3, Breslau, 1875, p. 183 and 204. Filamenta tenerrima achroa implicata convoluta muco inclusa in globulos perparvos congesta.

Type species (monotypy).—*M. gregarium.* Globuli gregarii in superfice aquae putridae natantes. The spheroidal or elliptical masses measure 10 to 17μ in diameter. Reproduction by division of the gelatinous mass itself. Segmentation not observed. If the gelatinous masses are pressed the threads break apart into short cylindrical, semicircular or ring-shaped segments.

Mycothamnion: Kützing, 1846.
Phycol. Germanica, Leipz., 1846, p. 126. See also Phycol. Generalis, 1843, p. 156. Defined as an alga, belonging near Leptomitus, Hygrocrocis, etc. *M. confervicola.* Bacteria have been erroneously included here.

Mycotheoe: Hansgirg, 1888.

Oesterr. Bot. Zeit, 38, Vienna, 1888, p. 227–230 and p. 266. Cells cylindric, straight or slightly curved in the middle; usually 1 to 1.5μ thick, rarely 2 to 3μ, and 3 to 6 times as long; colorless, single rarely in twos or fours, capsulated, not motile; reproduction by transverse division, spore formation unknown. The gelatinous masses are yellow to yellow-brown. Found in cellars and other damp places.

Type species (monotypy).—*M. cellaris* Hansgirg.

Mycothrix: Itzigsohn, prior to 1868, emend. Hallier, 1868.

According to Hallier: Parasitol. Untersuch. auf die Pflanz. Org., Leipzig, 1868, p. 7. Hallier emends Itzigsohn's term to include the " Leptothrix " chains of *Micrococcus*, formed under certain cultural conditions. Chains are rather long, unbranched. Cells sometimes knobbed and irregular in outline. Cohn says it is synonymous with his " torula-form."

Myxobacter: Thaxter, 1892.

Bot. Gaz., v. 17, No. 12, p. 403, 1892. See also idem, 1897, v. 23, p. 395. Rods forming large rounded cysts, one or more free within a gelatinous matrix raised above the substratum.

Type species (monotypy).—*M. aureus*. Pl. 25, figs. 34–36. Colonies when rising to form cysts are milky white. Rods large, cylindrical, rounded at either end, 4 to 7μ by .7 to .9μ. Cysts spherical or oblong, golden yellow, thick-walled, 1 to 12 or more in number distinct within a hyalin matrix 75 to 350μ by 75 to 275μ. The encysted rods are mingled with a yellow, oily material. Cyst groups are .7 to 1 mm. long. Hab.: On very wet wood and bark in swamps, Kittery Point, Me., and Belmont, Mass.

Myxobacterium: Faull, 1915.

Science, n. s., v. 42, N. Y., 1915, p. 469.

" A new Myxobacterium." (Does he refer to Thaxter's genus, *Myxobacter?*). The organisms heap up forming a stalked, branched, or unbranched, 1 to several headed fruiting body. On the heads columnar or conical cysts develop, on the surface of which a membrane is secreted. From these cysts the bacteria later migrate into the main body of the head, the husks of the cysts persisting as shriveled and twisted curls. Species remarkably variable in its morphology. Highly specialized.

Myxobazillus: Gonnerman, 1907.

See reference for *Myxokokkus*, p. 883.

Type species (monotypy).—*M. betae*. Slender rods, .3μ thick, 2.3 to 4.5μ long, often in twos or more, when they may be variously bent and curved. Easily stained with anilin dyes. No capsule. Nonmotile. Oval spores formed. Hab.: The sap used in the manufacture of sugar.

Myxobotrys: Zukal, 1896.

Ber. d. d. Bot. Gesellsch., v. 14, Berlin, 1896, p. 346. Places it among the Myxomycetes. Buchanan in J. Bact., v. 3, Balto., 1918, p. 542, says it is synonymous with *Chondromyces*. Spores in knoblike clusters on the widened out end of a simple or slightly branched sporophore or on a thin hypothallus or on the substratum.

Type species (original designation).—*M. variabilis*. Plasmodium flesh red, sporophore cylindrical, 1.4 to 1 mm. high, 20–30μ thick, yellowish and reddish transparent; knoblike end about 70μ wide and 40–50μ high. Spores about 20μ by 11–12μ, single on pointed end, yellowish or reddish in color and oval elliptical. The divided sporophores are botrytislike.

Myxococcus: Thaxter, 1892.

Bot. Gaz., v. 17, No. 12, 1892, p. 403. See also idem, v. 23, 1897, p. 395. Rods slender, curved, swarming together after a vegetative period, to form definite, more or less encysted, sessile or stalked masses of coccus-like spores.

Type species (first in order of arrangement and according to author most common species).—*M. rubescens.* Rod masses reddish, rods slender, irregularly curved, 3 to 7μ by .4μ. Spore masses scattered, droplike, flesh colored to dull orange. Deep crimson when dry; at first coherent, becoming deliquescent; 150μ to 1 mm. in diam., often confluent; spores round, 1.5 to 1.2μ in diameter. Habitat: On various decaying substances, lichens, paper, dung, etc. Includes here also: *M. virescens*, n. sp.; *M. coralloides*, n. sp.; *M. simplex*, n. sp.

Myxokokkus: Gonnerman, 1907.

Osterreichisch-Ungarische Zeit. f. Zuckerindust. u. Landw., v. 36, Vienna, 1907, p. 877. A "gelatin-forming Streptokokkus." The cocci are somewhat angular, and often 12 to 16 membered chains are found. Arthrospores. Involution forms.

Type species (monotypy).—*M. betae.*

Neisseria: Trevisan, 1885.

Atti della Accad. fisio-medico-statis. in Milano, ser. 4, v. 3, 1885, p. 105. See also Saccardo, Sylloge Fungorum, 8, 1889, p. 1067. Cocci primitus globosi indivisi, aetate provecta in coccos duos biscoctiformiter geminos, latere fraterem versus plus minus complanato, utrinque ad polos isthmis filamentosis tenuissimis insimul nexos, scissi, nunquam in turmas racemiformiter consociati. Endorsporae microsomae, in coccis normalibus obvenientes.

Type species (monotypy).—*N. gonorrhoeae.* Coccis biscoctiformiter geminis, 0.8 to 1.6μ, hyalinis.

Nevskia: Famintzin, 1891.

Bull. de l'Acad. Imp. des Sci., ser. 4, St. Petersburg, 1889–1892, p. 481. A branched "stiele," and around the outer edge of each branch are enclosed rodlike bacterial cells. Colonies result by the free rodlike organisms secreting a gelatinous material with production of the "stiele." The cells multiply by transverse division. Colonies variously shaped.

Type species (monotypy).—*N. ramosa.* Superficially like *Pasteuria ramosa.*

Newskia: Variant of Nevskia.

Nitrobacter: Winogradsky, 1892.

Arch. de Sci. Biol., pub. by l'Inst. Imp. de Med. Exper., St. Petersburg, 1892, v. 1, p. 87. Rodlike organisms, nonmotile, oxidizing nitrites to nitrates.

Type species (subsequent designation by Com. Soc. Am. Bact., in J. Bact., v. 2., no. 3, 1917, p. 552).—*N. winogradskyi* Committee. Description that given by Winogradsky, who named no species.

Nitromicrobium: Stutzer and Hartleb, 1901.

Mitt. d. Land. Inst. d. Breslau, v. 1, Berlin, 1901, p. 197. *N. germinans.* Oval, and at times drawn out (and with a sort of bud attached) rods. Both ends are never pointed. 1.5 to 2.5μ long by 0.6 to 0.8μ broad. Nonmotile. (Authors think this organism, and their *Hyphomicrobium*, belong in a special group among the microorganisms, probably not with the bacteria.)

Nitrosobacterium: Rullmann, 1897.
Centralbl. f. Bakt., Abt. 2, v. 3, 1897, p. 228.

Type species (monotypy).—*N. formae novae.* Small, thick, approximately isodiametric short rods. A nitrite former. Nonmotile. Single or in chains. Polar staining. Branched threads occur in liquid media.

Nitrosococcus: Winogradsky, 1892.
Arch. d. Sci. Biologiques, pub. by l'Inst. Imp. de Med. Exper., St. Petersbourg, 1892, v. 1, p. 87. Organisms which convert ammonia into nitrites, and isolated from the "soils of the new world." Cocci about 1.5 to 1.7μ in diam. Apparently capsulated, nonmotile. No zoogloeae in liquid media.

Nitrosococcus: (Winogradsky) Buchanan, 1918.
J. Bact., v. 3, No. 2, Baltimore, 1918, p. 180.

Type species (original designation).—*N. americanus.*

Nitromonas: Winogradsky, 1890.
Ann. de l'Inst. Past., v. 4, Paris, 1890, p. 258. Cells ellipsoidal, more or less elongated, the young cells nearly spherical. 0.9 to 1.0μ by 1.1 to 1.8μ. Sometimes among the oval cells one finds others in the form of spindles, with blunt ends, and exceptionally this form is the dominant one. Cells usually nonmotile or only very slightly so, but at times they show active motility. Division occurs perpendicularly to the long axis. Chains of 3 to 4 individuals rare. No filaments nor spores. Zoogloeae. A nitrifying soil organism. Syn. (Buchanan in J. Bact., v. 3, No. 2, Baltimore, 1918, p. 180) *Nitrosomonas* Winogradsky.

Nitromonas: Jensen, 1909.
Cent. f. Bakt., Abt. 2, v. 22, 1908–9, p. 312. Renames *Nitrobacter* Winogradsky. Nonmotile short rod.

Nitrosomonas: Winogradsky, 1892.
Same reference as for Nitrosococcus, p. 87. See also Ann. de l'Inst. Past., v. 4, Paris, 1890, p. 258. Organisms from the old world which occur in soil and are capable of transforming ammonia into nitrites.

Type species (monotypy, and subsequent designation, Buchanan, J. Bact., v. 3, No. 2, Baltimore, 1918, p. 180).—*N. europea.* Syn. (Lehmann and Neumann) *Bact. nitrosomonas.* Cells elliptical and short.

Nocardia:[1] Trevisan, 1889.
Gen. e Spec. delle Batteriacee, 1889, p. 9. According to Saccardo's Sylloge Fungorum, v. 8, 1899, p. 927. Filamenta tenuissima, evaginata, articulata, Cladotricis more pseudoramosa, nunc e nucleo firmo radialiter expansa, nunc varie coalita. Arthrosporae in filamentis normalibus obvenientes, transformatione cocci singuli ortae. Est Cladothrix sine vaginis. Syn. (Trevisan) *Streptothrix* Cohn; *Actinomyces* Hartz, *Discomyces* Rivolta.

Species.—*N. farcinica* Trevisan: Glomerulis minutis, e filamentis intricatis, inextricabilibus numerossimis, e puncto centrali opaco radiantibus, pseudodichotomis, et in Cladotrice, cylindricis, 0.8 to 1μ latis; arthrosporis ovalibus. Hab. In farcino bovino in Gallia, nunc rarius, in ins. Guadelupa frequenter. Also includes here: *N. actinomyces* Trevisan, *N. foesteri* (Cohn) Trevisan, *N. arborescens* and *N. ferruginea.*

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[1] Merrill and Wade (P. J. Sci., v. 14, No. 1, Jan., 1919, p. 59) state that De Toni and Trevisan's description of *Nocardia* as exhibiting false branching is incorrect, for although Nocard had originally so described his "bacille de farcin" Metchnikoff had found that it was a true branching organism. See *Discomyces.*

Nodofolium:[1] Ellis, 1908.

Proc. Roy. Soc. Edinburg, v. 28, Pt. 5, 1908, p. 339.

Type species (monotypy).—*N. ferrugineum.* Belongs to the iron bacteria. A flat band, constricted at regular intervals. At the constricted points the individuals are slightly humped—giving an arch. Varies greatly in size, depending upon number of loops. An individual of 2 loops 10µ long by 0.75 to 1.5µ. Others may have as many as 12 loops, each about 10 to 12µ long. Reproduces by formation of a large number of conidia formed in same way as those of *Leptothrix ochracea.*

Nosema: Naegeli, 1857.

Amtlicher Bericht über die drei u. dreissigste versamml. Deutsch. Naturf. u. Arzte z. Bonn, Sept., 1857, p. 133. See also Bot. Zeit. v. 15, 1857, p. 760.

Type species (monotypy).—*N. bombycis.* Causing "*pebrine*" of silk worms. Small, elongated or oval cells, single, colorless, staining brown with iodine. Belongs near *Umbina aceti.* Syn. (Cohn, Schröter, Woodhead, et al.) *Panhistophyton ovatum* Lebert.

Octopsis: Trevisan, 1884.

Atti d. Accad. Fisio-med.-Statist. in Milano, ser. 4, v. 3, 1883-1885, p. 102. Trevisan states here that he provisionally placed in this genus his *Bact. cholerae-gallinarum,* and Zopf's *Micrococcus cholerae-gallinarum.* He also included in this genus the cause of typhoid in horses: *Octopsis equorum* (*Bact. equorum* Trevisan). See *Pasteurella.*

Oenobacillus: Forti, 1901.

Ann. d. Soc. Chim. di Milano, v. 3, 1901, Fasc. I. Accord. to Centralbl. f. Bakt. Abt. 2, v. 8, 1902, p. 500.

Type species (monotypy).—*Oenobacillus albae.* Polymorphic; at first diplococcus-like, then rod-shaped, with one end rounded, and usually in pairs. Nonmotile. Causing "sick" wine.

Oospora: (Wallroth, 1833) Sauvageau and Radais, 1892.
Ann. Inst. Pasteur, v. 6, 1892, 242. They place in this fungus genus *Streptothrix* Cohn, and the *Actinomyces* of Harz. *O. bovis* (Hartz).

Ophidomonas: Ehrenberg, 1838.

Die Infusionsthierchen als volkommene Org., 1838, p. 43. Animal e familia cryptomonadinorum, ocello destitutum, lorica obtusa, nuda, statura filiforme et divisione spontanea transversa perfecta.

Type species (monotypy).—*O. jenensis.* O. corpore spiraliter curvato tenuissimo, utroque fine aequaliter obtuso, 48 vam lineae $\frac{1}{24}$ mm.) parten longo, olivaceo fuscente. Quite similar to *Spirillum.* Found in a basin of water "bei der Kirche des Dorfes". Buchanan (J. Bact., v. 3, No. 5, 1918, p. 471) states that this genus is synonymous (?) with *Thiospirillum.*

Ophyrothrix: Borzi, 1878.

Nuovo Giorn. Bot. Ital. (Caruel), 10 (old series), Pisa, 1878, p. 274. Separates the species of Leptothrix, placing those attached by a single extremity of the very slender delicate filaments to the body of the other plant in this genus.

Species.—*O. thuretiana,* and *O. investiens.* Trevisan (Sacc. Syllog. Fung. v. 8, 1889, p. 933) states that this genus is synonymous with his *Leptotrichia,* and he renames *O. thuretiana: L. thuretiana.*

Oscillaria leptomitiformis: Meneghini (Ragazz. Nuov. ric. fis-chim., prior to 1842, p. 122). Trevisan says this species is syn. with his *Beggiatoa leptomitiformis. Oscillaria alba* Vaucher (Hist. d. Conferv.. 1803, p. 198) Zopf states it is syn. with *Beggiatoa alba.*

Oscillaria: Bos. Bory, Dict. Class. 1, p. 594, and v. 12, p. 457=Kützing (Sp. Alg. 1849, p. 237) *Oscillatoria* (Vaucher). (Algae.)

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[1] See footnote under *Leptothrix.*

Oscillospira: Chatton and Pérard, 1913.

Compt. Rend. Soc. Biol. no. sp., v. 74, Paris, 1913, p. 1159.

Type species (monotypy).—*O. guilliermondi* n. sp. (Authors in doubt as to its systematic position. In structure it would seem to belong near *Arthromitus Saprospira, Pseudospira, Cristispira,* etc.) Found in the coecum of the guinea pig. Colorless, motile filaments containing endospores. Filaments measure 5μ in width up to 100μ in length. Rounded ends. Interior arranged in compartments of 1 to 2μ in length. Thickness varies. Cyptoplasm homogeneous and finely granular, without pigment or sulfur granules—no inclusions of any sort. The filaments multiply by transverse fission. The sporulating filaments are never numerous. Spores ellipsoidal, and measure from 2.5μ wide by 4μ long.

Pacinia: Trevisan, 1885.

Atti della Accad. fisio-med.-statis. in Milano, 4 ser., v. 3, 1885, p. 84. Three stages of development: (1) Bacilli, (2) filaments, (3) cocci. The bacilli (typical protoplasmic state) are cylindrical, more or less curved, inarticulate, uncolored, of two forms: long and short; cytoplasm homogeneous. The filaments are irregular, flexuous, variously bent and curved. The cocci are derived from the microbacilli, at first in short chains, finally free. Spores.

Species—*P. cholerae-asiaticae.* Syn. (Trevisan) *Vibrio cholerae* Pacini, 1854; *Spirillum cholerae-asiaticae* Zopf, etc.

Palmella: Lyngbye, prior to 1849.

Defined it as an alga. Bacteria have been erroneously included here, e. g., *P. mirifica* Rabenhorst, which Trevisan states is synonymous with *Micrococcus mirificus* Trevisan. Schröter states also that *Pal. prodigiosa* Montagne is synonymous with *Monas prodigiosa* (Ehrenberg) Perty, *Micrococcus prodigiosus* (*Bact. prodigiosus* Ehrenberg) Lehmann and Neumann.

Panhistophyton: Lebert, 1856.

Jahresb. über die Wirksamheit d. vereins z. Beförd. des Seidenb. d. Prov. Brandeng. 1856–57, p. 28. According to Frey and Lebert: Vierteljahrssch. d. Naturforsch. Gesellsch. in Zürich. Zürich, 1856, p. 374. Oval, one-celled bodies; about twice as long as broad; end parts usually rounded; very definite contour. Size rather uniform. Length about 0.004 mm. to 0.005 mm., at most 0.006 mm. by 0.0025 mm. broad. Oscillatory motion.

Type species (monotypy).—*P. ovatum.* Syn. (Miller, Schröter, et al,) *Nosema bombycis* Nägeli. Causing "pebrine" of silk worms.

Parachromatium: Beijerinck, 1903.

Arch. Néerl. Sci. Ex. et Nat. Sér. 2, v. 7, La Haye, 1903, pp. 197 and 216. He gives this name as a synonym for his genus *Azotobacter:* "Peut-être le nom de Parachromatium, qui indique la parenté de notre microbe avec le genre *Chromatium* de M. Winogradsky, serait-il préférable. Des considérations physiologiques m'avaient d'abord conduit à une tout autre opinion, mais des études ultériques me portent à croire que cette parenté générique est indubitable."

Species.—*P.* (*Azotobacter*) *chroococcum* Beijerinck and *A. agilis* Beijerinck.

Paracloster: Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 141. Nonmotile, without flagella, with endospores in spindle-shaped swollen-up rods. The spore often lies exactly in the center; it may lie in one of the ends.

Type species (monotypy).—*P. butyricus,* which he states (Vorlesungen über Bakt., 2 Aufl., Jena, 1903, p. 60), is syn. with *Granulobacter immobilis* Schattenfroh u. Grasberger.

Parameningococcus: Dopter, 1909.

Compt. Rend. de la Soc. Biol., 67, Paris, 1909, p. 74. Not defined by him as a genus, although the authorship has been ascribed to him. He wrote "para-meningocoques," using the term for a special "race" of the Meningococcus which, by absence of specific agglutination and the existence of coprecipitins, he distinguishes from the Weichselbaum *Diplococcus*.

Paraplectrum: Fischer, 1895.

Reference as for *Paracloster*. Rods, nonmotile, without flagella, with endospores in a headlike swollen end.

P. peroniella (*Bacillus peroniella* Klein 1889).

Paraspirillum: Dobell, 1911.

Arch. f. Protistenk., v. 24, 1911, pp. 97, 1 pl., 7 figs.

Type species (monotypy).—*P. vejdovskii.* Body like that of *Spirillum*, but flexible. Contains a nucleus centrally located visible in living organism, and of round, oval, square, or oblong form, often occupying whole width of the organism. Nucleus homogeneous usually, and staining deeply. Karyosome observed in some nuclei. Usually two very delicate flagella present, one at either end. Measures in length 8 to 25μ by 1.5 to 2μ across middle portion. Many highly refractive metachromatic granules (volutin) in cytoplasm surrounding nucleus. Motile in screwlike manner in either direction, and in a circular manner with one end—the other being fixed. Habitat: Found in a culture of fresh water Cyanophyceae.

Pasteurella: Trevisan, 1887.

Sul Micrococco d. rabbia, 1887, p. 7. Gen. e Spec. d. Batt., 1889, p. 21. According to Saccardo's Syllog. Fung., v. 8, 1889, p. 994. Baculi plasmate polari-diblastico foeti. Sporae (arthrosporae?) isosomae, microsomae. Syn. (Trevisan) *Coccobacillus* Gamaleïa, 1888.

Trevisan's original paper is not available, but judging by dates and comparisons he uses in Saccardo, it is probable that the first type studied by him was *P. cholerae-gallinarum.* Buchanan (J. Bact., v. 3, No. 1, 1918, p. 51) gives the type species as *P. cholerae-gallinarum.* Trevisan includes 18 species in his paper in Saccardo's Sylloge Fungorum (v. 8, 1889, p. 994). He gives the synonymy of *P. cholerae-gallinarum* as follows: *Coccobacillus avicidus* Gamaleïa, 1888; *B. cholerae-gallinarum* Flügge; *Bact. cholerae-gallinarum* Schröter, 1886.

Pasteuria: Metchnikoff, 1888.

Ann. de l'Inst. Pasteur, v. 2, No. 4, Paris, 1888, p. 165. An organism parasitic upon *Daphnia pulex* and *D. magna.* Characterized by longitudinal division. Young colonies appear more or less rounded, and are formed of cauliflowerlike masses—that is, there is a central trunk which is dichotomously branched; the branches are easily detached and gradually dissolution of all the members of the primitive colony is brought about and new colonies are formed. The detached bacteria resemble somewhat the genus *Clostridium*—that is, adult forms have one large rounded end, the other being pointed (point of attachment). The isolated cells produce endospores. Methylene blue staining reveals three distinct portions of the cell—anterior, middle, and pointed end (dividing end). The spore is formed in the anterior portion.

Type species (monotypy).—*P. ramosa.*

Pectinobacter: Makrinov, 1916.

Arch. d. Sci. Biol. de Petrograd, v. 18. No. 5, 1916. pp. 440–452. See also Bull. l'Inst. Past., Paris, Jan., 1917, p. 5.

Type species (monotypy).—*P. amylophilum.* Rods 4 to 6μ long by 0.5 to 1μ wide. Motile. Spores are formed, prior to which a fusiform aspect is assumed. Gram positive. Grows better on starch media than on any other. Active fermentative agent. Isolated from soil.

Pectobacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 342. Pectin-fermenting group of peritrichiate rods. Stain blue with iodin usually. Liquefy gelatin. Obligate anaerobes.

Pediococcus: Balcke, 1884.

Wochenschr. f. Brauerei, 1884, p. 183.

NOTE.—Balcke's paper is not available. Lindner in the references cited below states that he is following Balcke. Trevisan (Saccardo's Syllog. Fung., v. 8, 1889, p. 1050) cites *Pediococcus* Lindner.

Pediococcus: (Balcke) Lindner, 1887.

Die Sarcina-Organismen der Gährungsgewerbe. Diss., Berlin, 1888, p. 9. See also Centralbl. f. Bakt., v. 2, 1887, p. 340, and v. 4, p. 202, and Bot. Centralbl., v. 36, No. 43, p. 98. Globose or ovoid cocci in tetrads, that is, division in two directions.

Species.—*P. cerevisiae* Balcke. Globose, hyalin cocci 0.6 to 1.0μ in diameter, in regular tetrads. Habitat: In beer, malt, etc. Also includes here: *P. albus* Lindner.

Pediokokkus: Eisenberg, 1891.

Bakt. Diagnostik. Eisenberg, 1891, p. 25. Variant of *Pediococcus.*

Pedioplana: Wolff, 1907.

Centralbl. f. Bakt., Abt. 2, v. 18, 1907, pp. 9–26, 5 pls. A genus belonging to the Coccaceae. Individual cells motile by means of a flagellum, and measure 0.35 by 0.5 by 0.75μ. Division in two directions—"Merismopedienbildung."

Type species (monotypy).—*P. haeckeli.* Found in decaying turnips.

Pelochromatium: Lauterborn, 1913.

Zur Kenntniss einiger sapropelischer Schiz. Allg. Bot. Zeitschr. f. Syst., v. 19–20, 1913, No. 7–8, p. 99.

Type species (monotypy).—*P. roseum.* Places it under the "*Rhodobakteriaceae.*" Morphologically like *Chlorochromatium.* Distinguished only by the presence of bacteriopurpurin.

Pelodictyon: Lauterborn, 1913.

Allg. Bot. Zeitschr. v. 19–20, No. 7–8, Karlsruhe, 1913, p. 98. Places it under his new family *Chlorobakteriaceae.*

Type species (monotypy).—*P. clathratiforme* (*Aphanothece clathratiformis* Szafer.) Stretched out cells 0.002 to 0.003 mm. long. Yellow-green. Usually united into netlike bands, similar to *Thiodictyon* Winogradsky.

Pelogloea: Lauterborn, 1913.

Reference as for *Pelodictyon,* p. 99.

Type species (monotypy).—*P. chlorina* nov. gen. nov. spec.; yellow-green cells 0.003 to 0.004 mm. long, in chainlike threads embedded in a gelatinous mass. Colonies up to 1 mm. in diameter. Places it under his new family *Chlorobakteriaceae.* Found in decaying pond weeds.

Peloploca: Lauterborn, 1913.

Reference as for *Pelodictyon*, p. 99. Colorless, threadlike cell-series, united into bands or bundles. Contain pseudovacuoles. Nonmotile.

Type species.—P. undulata Lauterborn. Cell threads, loosely spirally wound, united into a wavy, parallel-striped bundle. Single cells measure 0.006 to 0.010 mm. The bundles 0.06 to 0.15 mm. long. *P. taeniata* Lauterborn. Rather broad cell threads, often united into bands, through which the pseudovacuoles of the single cells appear as if latticed. Cells 0.003 to 0.004 mm. long. The bands up to 0.7 mm. long. Often found in the rotten slime of Characeae.

Pelosigma: Lauterborn, 1913.

Reference as for *Pelodictyon*, p. 100.

Type species (monotypy).—*P. cohnii* (Perty) Lauterborn. Perty placed his *Spiromonas cohnii* among the flagellates.

Pelosphaera: Lauterborn, 1906.

Allg. Bot. Zeitschr. v. 12, No. 12, 1906, p. 196.

Type species (monotypy).—*P. rotans* nov. gen. nov. sp. Cells wedge-shaped, in front broadened and rounded off, with rather firm membrane and granular content. United into mulberrylike spherical to elliptical colonies. Motile by means of flagella. Young colonies are colorless, older ones yellow-brown. Single cells sometimes enlarge, containing interiorly a conspicuous, strongly light refracting spherical body (spore?). Diameter of a colony 0.015 to 0.040 mm. Multiplication observed only in division of colony. Habitat: Decayed pond weeds.

Peptonococcus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908-9, p. 340. Peptonizing, lactic-acid forming cocci.

Perroncitoa: Trevisan, 1889.

Gen. e Spec. delle Batt., 1889, p. 29. According to Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1053. Cocci compressi, lateraliter duo per duos seriati (diplococci transversales) in filamenta simplica, vaginis cylindricis membranaceo-gelatinosis obducta concatenati. Arthrosporae macrosomae in filamentis obvenientes. Cocci e vagina liberati exacte globulosi fiunt.

Type species (monotypy).—*P. scarlatinosa.* Habitat: In infantibus scarlatinosis.

Petalobacteria: Billroth, 1874.

Untersuch. über die Vegetationsformen von Coccobacteria septica, Berlin, 1874, p. 16. Platelike masses forming on the surface of liquids. The individual rods are united by a gelatinous substance.

Petalo-Gliabacteria: Billroth, 1874.

Reference as for *Petalobacteria*, p. 17. Formed through the confluence of the homogeneous membrane of the Gliabacteria. At first without motion, later motile. See *Coccobacteria.*

Petalococcos: Billroth, 1874.

Reference as for *Petalobacteria*, p. 6. The gelatinous membranes of the single little spheres melt into each other, forming slimy plates.

Pfeifferella: Buchanan, 1917.

Abstract presented to the Soc. Am. Bact., Dec. 28, 1917. See also J. Bact., v. 3, No. 1, Jan., 1918, p. 54. Under the family *Bacteriaceae.* Nonmotile rods, slender, Gram negative without spores, staining poorly sometimes forming threads and showing a tendency toward branching. Gelatin may be slowly liquefied. No carbohydrates formed. Growth on potato characteristically honeylike.

Type species (original designation).—*P. mallei,* the cause of glanders.

Photobacillus: Miquel and Cambier, 1902.

Traité de Bact. Paris, 1902, p. 881. Syn. Kat's light producing bacillus (Centralbl. f. Bakt., 1891, v. 9, p. 159). No species named—three species described by number.

Photobacter: Beijerinck, 1900.

Arch. Néerl. d. Sci. Ex. et Nat., ser. 2, v. 4, 1900, p. 6. A "genre physiologique." Apparently he uses this term interchangeably with his *Photobacterium*.

Species.—P. splendidum.

Photobacterium: Beijerinck, 1889.

Arch. Néerl. d. Sci. Ex. et. Nat., v. 23, 1889. p. 401. Light producing organisms (when grown in 3.5 per cent salt solution). Photogenic power lost by the addition of 2.5 per cent glucose. Grow best in a neutral or slightly alkaline solution—a trace of acid inhibits the formation of light.

Type species.—P. phosphorescens. Nonliquefying luminous bacteria of phosphorescent fish. *P. luminosum* Beijerinck; very small, resembling the cholera vibrio, but occurs also as short rods as well as spirals and short vibrios. *P. indicum:* Syn. (Beijerinck) *B. phosphorescens* Fischer. *P. fischeri.* Beijerinck states that all 4 species are so polymorphic that it is impossible to place them generically by means of their morphology, hence he uses physiological characters.

Photobakterium: Kruse, 1896.

Flügge: Die Mikroorganismen, v. 2, 1896, p. 333. Variant of *Photobacterium.*

Photospirillum: Miquel and Cambier, 1902.

Traité de Bact., Miquel and Cambier. Paris, 1902, p. 888. These authors name the vibrio described by Dunbar in Deutsch. Med. Woch., 1893, p. 799.

Species.—P. dunbari. Photogenic. Finest light is produced at 22° on gelatin prepared from peptonized beef bouillon. Pathogenic for guinea pigs.

Phragmidiothrix: Engler, 1883.

Vierter Bericht der Commission zur Wissenschaftlichen Untersuchung d. deutsch. Meere, in Kiel, 1883, p. 187. Filis rectis vel leviter flexuosis, gelatinosis, cellulis brevibus egranulosis.

Type species (monotypy).—*P. multiseptata.* Cellulis brevissimis, saepe diametro diversis, multis semel vel pluries septatis.

Phytobacter: Groenewege, 1912.

Meded. van de Rijks Hoog. Land-, Tuin- en Boschbouwschool, Deel v. 5, Afl. 5, Wageningen, 1912, p. 217.

Type species (monotypy).—*P. lycopersicum.* Rods of varying length, 1.5 to 2.5μ by 0.5 to 0.7μ. No spores. Very slightly resistant to heat. Young cultures motile. Zoogloea in old cultures, which appear as a complex of rods bound together by a viscous slime. Found in decaying tomato fruits.

Phytomyxa: Schröter, 1886.

Krypt-Flora v. Schlesien, Cohn. v. 3, Breslau, 1885–1889, p. 134. Described this genus as a myxomycete, and placed here Frank's *Schinzia leguminosarum,* which Frank later placed among the bacteria under the name of *Rhizobium leguminosarum.* See *Rhizobium.*

Planococcus: Migula, 1894.

Arb. aus d. Bact. Inst. d. Tech. Hoch. z. Karlsruhe. v. 1, Heft. 2, 1894, v. 2, Karlsruhe, 1897, p. 236. Family *Coccaceae* Zopf, emend. Migula. Cells spherical, sometimes flattened at points of contact when united in twos or fours. Divides in 1, 2 or 3 directions—2 directions most common. Endospores rare.

Type species (monotypy).—*P. citreus* (Menge) Migula.

Planomerista: Vuillemin, 1913.

Ann. Mycologici, 11, 1913, p. 523.

Type species (original designation).—*Micrococcus tetragenus mobilis ventriculi* Mendoza, 1889, which becomes *P. ventriculi.*

Planosarcina: Migula, 1894.

Reference as for *Planococcus*. Single cells spherical. Division in 3 directions. Motile by means of a flagellum.

Type species (first in order of arrangement).—*P. agilis* (Cohen) Migula.

Plectridium, Fischer, 1895.

Jahrb. f. wissensch. Bot., v. 27, Berlin, 1895, p. 147. Motile rods; peritrichiate flagella; endospores in headlike swollen end of the rods.

Type species (subsequent designation by Buchanan, J. Bact., v. 3, no. 2, Balto., 1918, p. 38).—*P. tetani* (Nicolaier) Fischer. The author includes here also *P. paludosum* n. sp., *P. tetani; Plectridium* des Rauschbrandes.

Plectrillum: Fischer, 1895.

Reference as for *Plectridium*, p. 144. Motile rods, with tufts of polar flagella. Endospores in headlike swollen end of the rods.

Plectrinium: Fischer, 1895.

Reference as for *Plectridium*, p. 142. Motile rods, with a single polar flagellum. Endospores as in *Plectrillum.*

Plennobakterium: Gonnerman, 1907.

Oesterr.-Ungar, Zeit. f. Zucker Ind. u. Landw. v. 36, Wien, 1907, p. 886. Belongs to the hay bacillus group. Nonmotile. Gram positive. Spores. Gelatin liquefied. Single rods measure 0.4 to 0.6μ wide, and 2.5 to 5μ long and longer. Ends rounded or finely pointed. Long threads are formed during rapid growth. Found in the air of the rooms in which sugar is manufactured.

Pleurococcus: Meneghini, 1842.

Monogr. Nostochinearum italicarum, Turin, 1842. An algal genus into which erroneously several species of bacteria have been placed: Trevisan says *Pl. beigelii* Küchenmeister and Rabenhorst is syn. with his *Chlamydatomus beigelii.*

Pleurospora: Trevisan, 1889.

Gen. e Spec. delle Batt., 1889, p. 22. According to Sacc. Sylloge Fungorum, v. 8, 1889, p. 1002. A subgenus of *Cornilia* Trevisan. Sporae macrosomae e latere protruberantes.

Pneumobacillus: Arloing, 1889.

Compt. Rend. de l'Acad. d. Sci., Paris, 1889, v. 109, pp. 428 and 459.

Type species (monotypy).—*P. liquefaciens bovis.* Cause of contagious peripneumonia of cattle. Facultative aerobe and anaerobe. Very short rods, sometimes subovoid in bouillon, which upon gelatin elongate and assume the regular form.

Pneumococcus:[1] Arloing, 1889.

Compt. Rend. de l'Acad. d. Sci., v. 109, 1889, p. 430. *P. gutta-cerei,* Arloing, *P. lichenoides,* and *P. flavescens.* All three species accompanying *Pneumobacillus liquefaciens bovis* in peripneumonia of cattle.

Pollendera: Trevisan, 1884.

De Toni and Trevisan, in Saccardo's Sylloge Fungorum, v. 8, 1889, p. 943, state that this genus is synonymous with *Bacillus* Cohn.

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[1] *Pneumococcus* is widely used in literature for *Diplococcus pneumoniae,* but the earliest use of the name in binomial combination seems to be that given here.

Polyangium: Link, 1795.

Dissert. Botanicae, 1795, pp. 42 and 65. Accord. Thaxter, Bot. Gaz., v. 17, 1892, p. 389, and v. 23, 1897, p. 395, and v. 37, 1904, p. 405. Motile, circularly moving rods which form large, rounded cysts, one or more free within a gelatinous matrix raised above the substratum.

Type species [subsequent designation (Buchanan, Thaxter)].—*P. vitellinum.* Quehl (Centralbl. f. Bakt., Abt. 2, v. 16, 1906, p. 17) describes this species: Rods arranged in spherical masses 100 to 300μ in size, surrounded by a golden yellow membrane. One to 8 and more of these cysts form a colony of 1 to 4 mm. embedded in a gelatinous mass. The rods in these cysts are 1.2 to 3μ long by 0.4μ broad. Thaxter says *Polyangium* and *Cystobacter* Schröter are synonymous. Buchanan (J. Bact., v. 3, No. 6, 1918, p. 542) states that *Polyangium* is synonymous with *Myxobacter* Thaxter.

Polybacteria: Van Tieghem, 1880.

Bull. Soc. Bot. de France, v. 27, Paris, 1880, p. 149. Colonies without a membrane, colorless, oval, composed of little rods arranged in all directions, dividing transversely, always in the same direction, often remaining in flexuous chains. *P. catenata,* as above. *P. sulfurea,* yellow rods, colonies round or polyhedral, dividing in two directions. Found on the surface of a liquid containing rotting beans.

Polycoccus: Kützing, 1841.

An algal genus into which species of bacteria have been erroneously placed.

Polycephalum: Kalchbrenner and Cooke, (Date—?)

According to Engler and Prantl: Die Natürlichen Pflanzenfam. 1 Teil, Abt. 1, Leipzig, 1900, p. 489. A fungous genus belonging to the Hyphomycetes. Buchanan (J. Bact. v. 3, No. 6, Baltimore, 1918, p. 542) says it is synonymous with *Chondromyces.* Type species (monotypy), *P. aurantiacum.*

Propionibacterium: Jensen, 1909.

Cent. f. Bakt., Abt. 2, v. 22, 1908–9, p. 337. Peritrichiate rods, which form propionic acid—belonging to the *Acidobacteriaceae* Jensen.

Proteus: Hauser, 1885.

Über Fäulnissbacterien und deren Beziehungen z. Septicämie. Gustav Hauser. Leipzig, 1885, pp. 12, 66. Cells rod-shaped, motile, of varying length and thickness; sometimes very short, sometimes long and slender. Single, in pairs, and in long threads. Facultative anaerobes. Involution forms. Colonies (especially on 5 per cent gelatin) show raylike, forked, and sausagelike outgrowths. Cause putrid decomposition of different organic substances.

Type species (original designation).—*Proteus vulgaris.* Usually slender thin rods, but also sometimes oval, 0.00042 to 0.00063 mm. long by 0.00094 to 0.00125 mm. broad. Polar staining with fuchsin or gentian violet. Actively motile. Gelatin liquefied. Zoogloeae. Hauser includes here also *Proteus mirabilis* Hauser, and *Proteus zenkeri* Hauser, separating them from *Proteus vulgaris* chiefly because of their action on gelatin, *P. zenkeri* not liquefying gelatin at all, and *P. mirabilis* much more slowly than *P. vulgaris.* He thinks they might be only varieties of *P. vulgaris.* See *Proteus* emended Wenner and Rettger, and also *Zopfius* Wenner and Rettger.

Proteus: (Hauser) emended Wenner and Rettger, 1919.

J. Bact., v. 4, No. 4, July, 1919, p. 335. Small colilike rods, 0.4 to 0.6μ by 1.2 to 2.5μ, with rounded ends; occurring singly, in pairs or in chains; gram-negative; no spores or capsules; actively motile by means of peritrichiate flagella; gelatin is usually liquefied rapidly, though this property may be entirely lost. When inoculated into the condensation water of agar slants the rapidly spreading growth eventually covering the entire surface is characteristic. Glucose, levulose, galactose, sucrose, glycerol, and occasionally maltose, are fermented, with production of acid and gas. Alkalinity is produced in litmus milk, followed by decoloration of the litmus and digestion of the casein. Widely distributed in nature, occurring in sewage, soil, stagnant pools, etc. The authors include here *Proteus vulgaris* Hauser and *Proteus mirabilis* Hauser. They separate the two species on the basis of carbohydrate fermentation, the former fermenting maltose with acid and gas production, the latter being unable to attack this disaccharide. They set aside the differentiating characters of Hauser, however. See *Zopfius* for *Proteus zenkeri.*

Proteus: Müller, 1786.
Animalculi Infusoria Fluviatilia et Marina. Havniae. 1786, p. 9. *P. diffluens.* Placed among the Infusoria crassiuscula. Stiles thinks this is probably an amoeba.

Proteus: Baker, 1752.
Polyg., According to Scudder, Gen. in Zool., 1882, p. 264.

Proteus: Roes, 1755.
Polyg., According to Scudder, Gen. in Zool., 1882, p. 264.

Proteus: Laur, 1768.
Rept., according to Scudder, Gen. in Zool., 1882, p. 264.

Proteobacter: Beijerinck, 1900.
Centralbl. f. Bakt., Abt. 2, v. 6, 1900, p. 195. Organisms causing the putrefaction of albuminoids.

Species.—*P. septicum* (Pasteur), *P. pseudopulcher* Beijerinck. Anaerobic.

Protococcus: Agardh, 1824.
Syst. Algarum, Lund, 1824, p. XVII. An algal genus. *P. roseo-persicinus* Kützing is syn. (Migula) with *Lamprocystis roseo-persicina.*

Pseudobacterium: Trevisan, 1888.
Rend. R. Ist Lombardo di Sci. Milano, Ser. 2, v. 21, 1888, p. 788.

Pseudodiplococcus: Bonôme, 1888.
Centralbl. f. Bakt., v. 4, 1888, p. 321.

Type species (monotypy).—*P. pneumonicus.* Oval cocci in pairs or short chains, often surrounded by a transparent capsule. Grows on gelatin. Pathogenic to guinea pigs. Found in pleuropericarditis and cerobrospinal meningitis.

Pseudomeningococcus: Elser and Huntoon, 1909.
Med. Res., v. 20, 1909, p. 384. Not used in a generic sense. "We have reserved this term for a group of organisms which can not be differentiated from the meningococcus excepting by serum reactions."

Pseudomonas: Migula, 1894.[1]
Reference as for *Planococcus*, p. 876. Cells of varying length, cylindrical, straight, never curved; division in but one direction; short threads sometimes; polar flagella. Endospores rare, but do occur in some species. Syn. (Migula): *Bactrinium* Fischer, *Clostrinium* Fischer, *Plectrinium* Fischer, *Arthrobactrinium* Fischer, *Bactrillum* Fischer, *Clostrillum* Fischer, *Plectrillum* Fischer, *Arthrobactrillum* Fischer.

Type species (monotypy).—*Pseudomonas violacea* (Schroter, 1886) Migula.

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[1] See emendation by Com. Soc. Am. Bact., in J. Bact., v. 2, 1917, p. 556, and idem, v. 5, 1920, p. 203.

Pseudorhizobium: Hartleb, 1900.

Chem. Zeit., v. 24, Cöthen, 1900, p. 887.

Type species (monotypy).—*P. ramosum*. An organism very similar to Frank's *Rhizobium leguminosarum*, but does not produce root-nodules.

Pseudosarcina:

This term has been used by many authors, who give authorship to Mazé, who used "pseudo-sarcine."

Pseudo-Sarcine: Mazé, 1913.

Compt. rend. de l'Acad. Sci., Paris, v. 137, 1903, p. 887. Spherical, arranged in more or less voluminous aggregations, of a muriform aspect. Found in a flask of water containing fermenting leaves.

Pseudospira: Trevisan, 1889.

Gen. e Spec. d. Batt., 1889, p. 23. According to Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1018. A subgenus of *Pacinia*. Baculi curvi, non raro semicirculares, saepissime in filamenta undulato-flexuosa vel irregulariter pseudo-spiralia, nunquam vere spiraliter ut in Spirilleis torta, consociata.

Punctula: van Tieghem, 1880.

Bull. Soc. Bot. de France, v. 27, Paris, 1880, p. 150. Spherical cells, without membrane, which aggregate to form a "punctula." Usually very small—"innumerable points united by a gelatinous cement."

Species.—*P. rosa*. Colonies rose color, composed of cells arranged regularly in concentric circles, and in radial series. After each division the two halves of the colony grow and completely separate. *P. cubica:* "Grains" are slightly larger, and are colorless. Grouped in the form of a cube, which divides successively parallel to the three faces. *P. glomerata:* All three species found on putrefying plant parts.

Punctum: Mühlhäuser, 1884.

Virchow's Archiv., v. 97, 1884 p. 97, pl. 13, figs. 1–7. Very small (0.0005 mm.) of varied from, but usually oval; at first not motile, later very lively, moving around in a circular fashion. It can traverse 0.1 mm. in one second. In young cultures (stagnant water) the longer forms are found. No chains or filaments.

Type species.—*Punctum saltans*. Syn. (Trevisan, Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1008) *Spirillum obermeieri* Cohn, 1875 (Beit. z. Biol. der Pflanzen, v. 1, p. 196).

Putribacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 342. Peritrichiate rods, anaerobic, putrefactive.

Includes here: *Bacillus putrificus*, which becomes *Putribacillus vulgaris*.

Pyobacillus: Koppányi, 1907.

Zeit. f. Tiermed. v. 11, Jena, 1907, p. 448. Anaerobic, polymorphic, capsulated bacillus. Grows only at body temperatures and on albuminous media. Found in pleural exudate of dog.

Type species (monotypy).—*Pyobacillus capsulatus cuniculi* (*Bacillus capsulatus pyaemiae cuniculi*) n. sp. Com. Soc. Am. Bact., in J. Bact., v. 2, no. 5, 1917, p. 561, state that this genus is synonymous (?) with their *Hemophilus*.

Pyobacterium: Küttner, 1895.

Zs. f. Hyg., v. 19, Heft 2, p. 263. See also Centralbl. f. Bakt., Abt. 1, v. 17, Jena, 1895, p. 760.

Type species (*monotypy*).—*Pyobacterium fischeri.* Synonymous (Küttner) with *Eiterbacterium.*

Pyococcus: Ludwig, 1892.

Lehrb. d. niederen Kryptog., 1892, p. 37. Used by Ludwig as synonymous with *Staphylococcus pyogenes.*

Rasmussenia: De Toni and Trevisan, 1889.

Saccardo's Sylloge Fungorum, v. 8, 1889, p. 930. Filamenta cylindrica, vagina tenui gelatinosa facile evanescente obducta, simplicia, basi subivulo zoogloeico affixa, articulata. Multiplicatio bacilis primitus vivaciter mobilibus, cito, immotis. Arthrosporae transformatione cocci singuli ortae.

Species.—*Leptothrix gigantea* (Miller). *L. buccalis* Robin and Lebert, *R. maxima* Trevisan; *R. anceps* Trevisan, *R. variabilis* (Rasmussen) Trevisan.

Rhabdochromatium: Winogradsky, 1888.

Beitr. z. Morph. u. Phys. d. Bact., Leipzig, 1888, Heft 1, p. 100, pl. 4. Cells rod-shaped or spindle-shaped, with polar flagella. Of varying length, usually rather long, S granules present. Cells free, capable of swarming at any time.

Species.—*R. roseum.* Syn. (Winogradsky) *Rhabdomonas rosea* Cohn. 3 to 7μ thick by 15 to 30μ long. Rose-red in color. *R. minus* Winogradsky and *R. fusiforme* Winogradsky.

Rhabdomonas: Cohn, 1875.

Beit. z. Biol. d. Pflanzen, Cohn. v. 1, 1870–75, p. 167. Cohn says he is following Ehrenberg, who called some of his " Stabmonaden " " Rhabdomonaden " (Die Infusionsthierch., 1838, p. 15) under which he puts *Monas okenii,* etc.

Type species (monotypy).—*R. rosea.* Spindle-shaped rose-red bodies, both ends of which are pointed. Sometimes 8 times as long as broad. Breadth 3.8 to 5μ by 20 to 30μ. Multiplication by transverse division. Contain highly refractive granules. A clear vacuole in the middle or end was observed. Motile by means of 1 flagellum.

Rhabdomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 334. Renames *Rhabdochromatium* Winogradsky.

Rhizobacterium: Kirchner, 1895.

Beitr. z. Biol. d. Pflanzen, Cohn., v. 7, 1894–1896, Breslau, 1896, p. 221. Modifies *Rhizobium* Frank, because of the "Aphiden-Gattung von Burmeister den Namen Rhizobius erhalten hat, welcher bis jetzt in Geltung geblieben ist."

Type species (monotypy).—*Bacterium* (*Rhizobacterium*) *japonicum,* n. sp. Cells rodlike, mostly slightly curved, 3.2 to 3.6μ long by 0.8μ thick, with granular content. Not motile. Gelatin not liquefied. Habitat: In soil in Japan, and causing root-nodules on soy bean.

Rhizobium: [1] Frank, 1890.

Landw. Jahrb., v. 19, 1890, p. 563, 14 pls.

Type species (monotypy).—*R. leguminosarum:* Syn. *Schinzia leguminosarum* Frank. A micrococcus or short rod, at times motile. There are also zoogloeal forms and threadlike slimy masses. Can live saprophytically as well as parasitically through its ability to assimilate organic nitrogen. Lehmann and Neumann (Atlas u. Grund. d. Bakt., part 2, Munich, 1904, p. 215) state that *Rhizobium radicicola* (Beijerinck) Hiltner and Störmer, 1891, is synonymous with *Bacterium radicicola* Beijerinck.

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[1] See *Schinzia.*

Rhizomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 328. Polar flagellate obligate aerobes, capable of oxidizing carbon compounds, of reducing nitrates to nitrites, and in part also further to ammonia; assimilate atmospheric nitrogen. Renames the genus *Rhizobium*. Includes *R. beijerinckii* and *R. radicicola.*

Rhodobacillus: Molisch, 1907.

Die Purpurbakterien. Molisch, Jena, 1907, p. 14.

Type species (monotypy).—*R. palustris.* Short rods, 1.5 to 2.5μ long by 0.5μ broad. Rounded ends. Single or in chains of 2 to 4 individuals. Length varies with kind of media. Slightly motile. Contain bacteriopurpurin and bacteriochlorin. Free living.

Rhodobacterium: Molisch, 1907.

Reference as for *Rhodobacillus*, p. 16.

Type species (monotypy).—*R. capsulatum.* Short rods, almost coccuslike. 0.9 to 1.8μ long. On gelatin 0.9 to 2.7μ. Capsulated. Nonmotile. Contain bacteriopurpurin and bacteriochlorin. Free living in sea water.

Rhodocapsa: Molisch, 1906.

Bot. Zeit., Abt. 1, v. 64, 1906, pp. 221 and 232.

Type species (monotypy).—*R. suspensa.* Cells rod or sausage-like, both ends rounded. All gradations from short rods to rather long threads, 3.5 to 180μ long by 1.8 to 3.5μ wide. Average length 10 to 20μ. Usually capusulated, the colorless, homogeneous capsule measuring 3.6 to 18μ. Capsulated individuals motionless. Noncapsulated, actively motile. Sulphur granules or "airsomen" present. Bacteriopurpurin and bacteriochlorin also present.

Rhodococcus: Molisch, 1907.

Reference as for *Rhodobacillus*, p. 20.

Species.—*R. capsulatus:* Cocci 1.5 to 1.8μ. Capsule measures 3 to 3.6μ in diameter. Not motile. Bacteriopurpurin and bacteriochlorin present. Free living (hay and other infusions). *R. minor.*

Rhodococcus: Zopf, 1891.

Ber. d. deutsch. Bot. Gesellsch., v. 9, 1891, p. 28. Defines it as a subgenus of Micrococcus. Cells containing a red pigment. Irregularly grouped. No capsule.

Species.—*R. erythromyxa* (renaming *Micrococcus erythromyxa* Zopf) and *R. rhodochrous* Zopf.

Rhodococcus: [Zopf] em. Winslow and Rogers, 1906.

Biol. studies by the pupils of W. T. Sedgwick, Boston, June, 1906, p. 206. Saprophytes. Cells in groups or regular packets. Generally decolorize by Gram. Growth on agar abundant, with formation of red pigment. Dextrose broth slightly acid, lactose broth neutral. Gelatin rarely liquefied. Nitrates generally reduced to nitrites, but not to ammonia. The authors include here: *R. cinnabareus* Flügge; *R. roseus* Flügge; *R. fulvus* Cohn; *R. agilis* Ali Cohen; *R. incarnatus* Gruber.

NOTE.—Buchanan (J. Inf. Dis., v. 17, No. 3, 1915, p. 239) says that *Rhod*[illegible]*coccus* Winslow and Rogers may be regarded as an emendation of *Rhodococ*[illegible] Zopf.

Rhodocystis: Molisch, 1907.
Die Purpurbakterien, etc. Molisch, Jena, 1907, p. 22.

Type species (monotypy).—*R. gelatinosa.* Rods with rounded ends, narrowing somewhat toward the middle; 2 to 5μ by 0.6μ. Single cells or different sized groups surrounded by a gelatinous substance. Bacteriopurpurin and bacteriochlorin present. Found in standing water containing maple leaves, and in hay infusion.

Rhododictyon: Jensen, 1909.
Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 330. Red sulfur bacteria, with pointed ends, motile.

Type species [by inclusion (see Buchanan, J. Bact., v. 3, No. 5, 1918, p. 469].—*R. elegans.* Renames *Thiodictyon* Winogradsky.

Rhodomonas: Jensen, 1909.
Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 327. Bright red sulfur bacteria. Renames *Chromatium* Perty.

Rhodonostoc: Molisch, 1907.
Die Purpurbakterien, etc. Molisch, Jena, 1907, p. 23.

Type species (monotypy).—*R. capsulatum.* Cocci, or coccus-like rods, with rounded ends, single, in twos and short rosary-like chains. Capsulated. 1.4 to 2μ without capsule. Capsule 2.7 to 8μ by 21μ long. Not motile. Found in water containing rotting maple leaves.

Rhodopolycoccus: Jensen, 1909.
Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 331. Renames *Thiopolycoccus* Winogradsky.

Rhodosarcina: Jensen, 1909.
Reference as above, p. 331. Renames *Thiosarcina* Winogradsky.

Rhodosphaera: Buchanan, 1918.
J. Bact. v. 3, No. 5, Sept., 1918, p. 472. Under subfamily *Rhodobacterioideae* Buchanan. (Syn. *Rhodococcus* Molisch.) Cells rod-shaped, nonmotile, free, not united into families.

Type species (original designation).—*R. capsulatus* (Molisch) Buchanan.

Rhodospirillum: Molisch, 1907.
Reference as for *Rhodonostoc*, p. 24.

Type species (subsequent designation by Buchanan in J. Bact., v. 3, No. 5, 1918, p. 473).—*R. rubrum* (Esmarch) Molisch. *R. photometricum:* Thick spirilla 5 to 13μ long by 1.4μ thick. Actively motile by means of a polar flagellum. Free living. *R. giganteum*: Longer and thinner than above.

Rhodothece: Molisch, 1906.
Bot. Zeit., Abt. 1, v. 64, 1906, p. 230 and 232. See also Die Purpurbakterien, Molisch, 1907, p. 19. Cells round, usually in pairs; nonmotile; contain S granules; cells surrounded by a colorless capsule. Red "airsomen" also present. Cells measure 1.8 to 2.3μ in diameter, the capsule 3 to 14μ.

Type species (monotypy).—*R. pendens.*

Rhodovibrio: Molisch, 1907.
Reference as for *Rhodonostoc*, p. 21.

Type species (monotypy).—*R. parvus.* Slightly curved, short rods. 1.6 to 2.1μ by 0.9μ broad. One long, wavy flagellum, rarely 2. Positively chemotactic for dilute acids.

Rickettsia: Da Rocha Lima, 1916.[1]

Berlin klin. Wochenschr., May 22, 1916, p. 567. According to Brumpt., Bull. Soc. Path. Exot., v. 11, No. 3, March, 1918, p. 253. Easily stained by Giemsa. Young individuals elliptical, short, almost globular. During division, biscuit-shaped. Measure 0.3 to 0.4μ. Da Rocha Lima considers his organism (Münch. med. Woch. v. 44, Jan., 1917, p. 33) identical with that found by Ricketts and Wilder.

Type species.—R. prowazeki. Cause of typhus exanthematicus.

Rickettsia: (Da Rocha Lima) emended Arkwright, Bacot and Duncan, 1919.

J. Hyg., v. 18, no. 1, April, 1919, p. 76.

NOTE.—This should probably not be regarded as an emendation, but rather an amplified description. Since Da Rocha Lima's paper is not available it is impossible to determine this point.

Very small, 0.3 to 0.5μ by 1.5 to 2μ. Morphologically like a coccus, diplococcus or a short bacillus. Gram-negative. Not acid fast. Stains well by Giemsa, appearing as small dots, paired cocci or bipolar staining bacilli with an unstained central part. Not motile. Occurs sparsely in blood films. Not successfully grown on artificial media.

Prowazek regards this organism as a protozoon largely because it is insect borne, and Da Rocha Lima seems rather inclined to this view on account of its peculiar staining reactions. Arkwright, Bacot, and Duncan, however, regarded its Giemsa staining reactions as quite like those of other bacteria. They conclude: "Nevertheless this class of microorganism and its associated diseases appear to have sufficiently distinct characteristics to justify the retention of the name Rickettsia for the present." They state that Da Rocha Lima found these bodies in the midgut of lice (*Pediculus humanus*) fed on trench fever patients, and that he considered the species causing typhus and trench fevers distinct. In typhus he claimed that the organism (*Rickettsia prowazeki*) invaded the epithelial cells of the gut wall, while only rarely is this the case with the trench fever organism (*R. quintana*), and with *R. pediculi* which is found in normal lice. He also claims that morphological differences are easily discernible if serial sections are cut. He infected a few guinea pigs, but was not able to pass the disease on from pig to pig, nor to infect mice.

Saccharobacillus: Van Laer, 1892.

Mem. Couron. et autres Mém. pub. par l'Acad. Royale d. Belgique, v. 47, 1892, pp. 1–37. Filiform bacillus, found in spoiled beer by Pasteur: Grows very slowly; ferments saccharose without previous inversion.

Type species (monotypy).—*Saccharobacillus pastorianus.*

Saccharobacter: Beijerinck, 1900 (?).

Centralbl. f. Bakt., Abt. 2, v. 6, 1900, p. 200. See also Arch. Néerl. sér. 2, v. 4, 1900–1901, p. 9. Aerobic, sugar fermenting bacteria. Includes *Bacillus megatherium* and *B. hortulensis.*

Salmonella: Lignières, 1900.

Bull. Soc. Centr. de Méd. Vét. n. s., v. 18, Paris., 1900, pp. 389 and 402. Cause of "hog-choléra de Salmon" or "schweinpest." Usually a very short rod, but in bouillon it becomes somewhat longer. Motile by means of peritrichiate flagella. Gram negative. No spores. Gelatin not liquefied. Pathogenic for rat, rabbit, etc. Buchanan (J. Bact., v. 3, No. 1, 1918, p. 53) makes this a subgenus of *Bacterium.*

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[1] See footnote under *Dermacentroxenus.*

Saprospira: Gross, 1911.

Mitt. aus der Zool. Stat. z. Neapel, v. 20, Heft 2, p. 189. Places this genus under the *Spironemaceae* Gross. Spirally bent bodies. Multiplication through " Zerfallstheilung ". Free living.

Species.—*S. grandis* n. sp. Average length of mature individual 100μ. Highest number of windings 15. Length of single windings 6 to 6.5μ. Thickness 0.8μ. Spores. Buchanan (J. Bact., v. 3, no. 4, 1918, p. 544) designates this species as the type.

S. nana. n. sp. Average length of mature individual 36μ. Highest number of windings 16. Length of single winding 2.25 to 3μ. Thickness 0.5μ. No spores.

Sarcina: [1] Goodsir, 1842.

The Edinburgh Medical and Surgical Journal, v. 57, 1842, p. 430, Pl. VII, figs. 2, 3. Plants coriaceous, transparent, consisting of 16 or 64 four-celled square frustules, arranged parallel to one another in a square transparent matrix. " It exhibits no mouths, no oral appendages, no visceral sacs, and its cells, instead of having the gelatinous appearance so familiar to the observer of the animal infusorials, are clear, transparent, as if empty, and have that consistency of wall charácteristic of vegetable structure. Believing *Sarcina* to be a vegetable, I may state, in reference to its characters, that they are of a kind which distinguish it from all the gonioid plants at present known. * * * It makes the nearest approach to *Gonium hyalinum* which with *Gonium glaucum* and *G. tranquillum*, even Ehrenberg, himself, seems inclined to hand över to the botanists under the generic term *Gonidium.* The generic characters of *Sarcina* are to be found in the predominance of the constituent cells over the outer coat or lorica, in each frustule being four-celled, and in the entire freedom of these from all colored contents. Of the specific characters of a single species much can not be said."

Type species (monotypy).—*Sarcina ventriculi* Goodsir. Frustules 16; color light brown; transparent matrix very perceptible between the frustules, less so around the edges; size ".800 to .1000 of an inch" " The individual organisms were transparent and slightly yellow or brown. When carefully examined under favorable circumstances the cell walls appeared rigid, and could be perceived passing from one flat surface to the other as dissepiments. These dissepiments, as well as the transparent spaces, were from compression of contiguity rectilinear, and all the angles right angles; but the bounding cells bulged somewhat irregularly on the edges of the organism by reason of the freedom from pressure. These circumstances gave the whole organism the appearance of a wool pack, or of a soft bundle bound with cord, crossing it four times at right angles, and at equal distances." Found in the human stomach.

Sarcina: (Goodsir) emended Winslow and Rogers, 1905.

Science, n. s., v. 21, 1905, p. 669. See also J. Inf. Dis., 1906, v. 3, pp. 490, 545; The Systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908, and Biol. Studies by Pupils of W. T. Sedgwick, Boston, 1906, p. 206. Faculative parasites or saprophytes. Division occurs under favorable conditions in three planes, producing regular packets. Generally decolorize by Gram. Growth on agar abundant, with formation of yellow pigment. Dextrose broth slightly acid; lactose broth generally neutral. Gelatin frequently liquefied. Nitrates may or may not be reduced. They include here the following species: *S. ventriculi* Goodsir, *S. lutea*, *S. aurantiaca* Flügge, and *S. subflava* Ravenel, and *S. tetragena* (Mendoza) Migula.

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[1] *Sarcina* may lay claim to antiquity since it was the first genus defined as a plant, and still retained among the bacteria.

Sarcinacoccos: Billroth, 1874.
Same reference as for *Coccos* Billroth. p. 8. See *Coccobacteria*.

Sarcinaglobulus: Poulsen, 1879.
Vidensk. Meddelelser fra Naturh. Forenink i Kjobenhavn, 1879–80, p. 232. Schizphytarum corpora perpava hyalina e cellulis incoloribus minimis composita formans. Cellulae plantae vivae vix conspicuae reagentibus chemicis additis apparent. Divisionis modus ut in Sarcina, quacum maximam similitudinem habet. Ab hoc genere eo differt, quod non fasiculos hexaedricos sed globulos vel flebas subisodiametricas vel irregulares rotundatas format. Nucleum cellularum non observati. Species adhus una cognita, scil.

Type species (monotypy).—*S. punctum.* Char. gen.: Magn. 2 to 200μ. In limo putido litoris freti cresund prope Haunias legi.

Sarcinastrum: Lagerheim, 1900.
Bihang till Kongl. Svenska Vet.-Akad. Hand. Afd. 3, No. 4, Stockholm, 1900, p. 9.

Type species (monotypy).—*S. urosporae.* Parasitic on Urospora spp. Polymorphic. Rod and coccus forms. The rod form goes over into the coccus form. Rods cylindrical with rounded ends, measure 4 to 5μ by 2μ, and divide by longitudinal division, thus forming very characteristic semispherical and spherical (hollow) colonies. When the colony has attained a certain size the rods begin dividing by cross division, producing the coccus form.

Schinzia: Frank, 1879.
Bot. Zeit., v. 37, 1879, p. 376. A mold genus into which Frank first placed his *Rhizobium leguminosarum*, designating it as *Schinzia leguminosarum*. Schroeter thought the organism a slime mold and formed the new genus *Phytomyxa* for it. Beijerinck named the organism *B. radicicola.* The committee on Classification of the American Bacteriological Society (J. Bact., v. 3, No. 1, Baltimore, 1918, p. 46) recommends that *Rhizobium* be used rather than *Phytomyxa*.

Schinzia: Dennstatt (Fungi), 1818.

Schinzia: Nägeli (Fungi), 1842.

Schmidlea: Lauterborn, 1913.
Allg. Bot. Zeitschr., v. 19–20, No. 6, Karlsruhe, 1913, p. 98. Places it under his new family *Chlorobakteriaceae*.

Type species (monotypy).—*S. luteola* (*Aphanothece luteola* Schmidle). Elliptical cells, yellow green, 0.0015 to 0.002 mm. long, united into roundish to oval, often gelatinous colonies, which sometimes enclose a vacuole-like space. Colonies usually 0.2 to 0.3 mm. in diameter.

Schuetzia: Trevisan, 1889.
Gen. e Spec. delle Batt., 1889, p. 29. According to Sylloge Fungorum, Saccardo, v. 8, 1889, p. 1052. Cocci globosi vel divisionis tempore ovoidei, in filamenta moniliformiter concatenati, capsulis membranaceo-gelatinosis, arctis, tenuiusculis. homogeneis, nonlamellosis obducta. Arthrosporae macrosomae in filamentis obvenientes.

Species.—*S. lagerheimii* (Ludw.), *S. laughlini* Trevisan, etc.

Sclerothrix: Metchnikoff, 1888.

Virchow's Arch., v. 113, 1888, p. 70.

Type species (monotypy).—*S. kochii.* Renames *Bacillus tuberculosis* Koch. Bases his genus on the thread formation and dense envelope which this organism possesses.

Sclerothrix: Kützing, 1837.

Alg. aq. dulc., Dec. II, No. 27. Defined here as an alga, with *S. callitrichae* as the type species.

Semiclostridium: Maassen, 1905.

Arb. Biol. Abteil. f. Land. u. Forstw. am Kaiserl. Gesund. Heft 1, v. 5, 1905, p. 6.

Type species (monotypy).—*S. commune.* Aerobic rod, spore-forming, and according to Fischer's classification belongs to the subfamily *Clostridiaceae.* A cylindrical vegetative body, which appears to be slightly arched at the ends. Measures 0.75μ by 2 to 5μ. Widely distributed on roots, plant surfaces, etc.

Serratia: Bizio, 1823.

Polent. porporp. in Bibl. Ital. v. 30, 1823, p. 288. According to Trevisan, Rend. Reale Ist. Lomb. Ser. 2, 1897, pp. 12, 141.

Type species (according to Vuillemin, Ann. Mycol. v. 11, 1913, p. 518.)—*S. marcescens* Bizio 1827.

Serratia: (Bizio, 1823) emend. Vuillemin, 1913.

Ann. Mycol. v. 11, 1913, pp. 518, 523 and 525. In order to avoid a neologism he retains Bizio's name for rods provided with peritrichiate flagella, giving as the type species *S. subtilis* (*Vibrio bacillus* Müller,) *V. subtilis* Ehrenberg, *Metallacter bacillus* Perty, 1852, *Bacillus subtilis* Cohn.

Siderocapsa: Molisch, 1910.

Ann. d. Jard. Bot. de Buitenz., Suppl. 3, pt. 1, 1910, pp. 29–33. See also Die Eisenbakterien. Hans Molisch, Jena, 1910, p. 11.

Species—*S. treubii.* Belonging to the "kapselbakterien." Coccus-like, capsulated—1 to 8 often within one capsule, which is gelatinous, brownish. Cocci measure, 0.4 to 0.6μ. Bright ellipsoidal halo around the cocci, measures 0.1μ to 3.6μ, surrounding which is the iron oxide area, with a diameter of 5 to 18μ. Habitat: An epiphyte on the roots, root-hairs, and leaves of water plants. *S. major.*

Siphonomyxa: Billroth, 1874.

Reference as for Coccos Billroth, p. 27. Vegetative forms quite similar in size and form to *Coccobacteria septica,* that is: streptobacteria, gliacoccos, ascococcos, mycelial-like threads containing spores which develop into bacteria, etc. In mass the color is bright grayish yellow. *S. noscomii viennensis.*

Solidococcus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 332. Polar flagellate cocci, not liquefying gelatin.

Solidovibrio: Jensen, 1909.

Reference as for *Solidococcus,* p. 333. Polar flagellate vibrios not liquefying gelatin. Reduce sulfates forming H_2S.

Sphaerococcus: Marpmann, 1886.

Ergänzungsh. z. Cent. f. Allg. Gesundheitspflege, v. 2, Heft 2, Bonn, 1886, p. 121.

Type species (monotypy).—*S. lactis acidi.* A very small, oval coccus in twos and more, forming torula-like chains. Nonmotile. A milk fermenting organism.

Sphaerococcus: Agardh (exp. 1823), emend. Kützing, 1843.

Phyc. Gen., 1843, p. 408. An algal genus into which species of bacteria have been placed erroneously.

Sphaerokokkus: Eisenberg, 1891.

Bakt. Diagnostik, 1891, p. 50. Variant of *Sphaerococcus.*

Sphaerotilus: Kützing, 1833.

Linneae, v. 8, Berlin, 1833, p. 385, pl. 9. Kützing defined this genus as a fresh-water alga, but Migula (Syst. d. Bakt., v. 2, 1900, p. 1035) includes it among his *Chlamydobacteriaceae.* See also Buchanan, J. Bact., v. 3, no. 3, Balto., 1918, p. 303. Frons mucosa tenerrima fragillina filamentosa, filis paralleliter agglutinatis constituta fila e globulis hyalinis longitudinaliter dispositis, massae sporaceae mucosae ope conjunctis composita.

Type species (original designation).—*S. natans* Kützing. Frons lutescentifusca, plumosa, divisione ramosa. Trevisan says this species is syn. with *Leptothrix natans* Denaeyer.

Sphaerotilus (Kützing) em. De Toni and Trevisan, 1889.

Saccardo's Sylloge Fungorum, v. 8, 1889, p. 926. Filamenta premitus affixa, basi ab apice superiori distincta, initio simplicia, dein Cladotricis more pseudoramosa a basi ad apicem subaequilata, articulata, vagina gelatinosa obducta, in fasciculos crassos floccosos varie divisos consociata. Multiplicatio fragmentis, filamentorum secedentibus, quae filamenta et fasciculos novos efficiunt. Arthrosporae numerosissimae, articulorum divisiones in tres directiones ortae.

Sphaerotilus (Kützing) em. Engler, 1903.

Syllabus der Pflanzenfamilien, ed. 3, p. 5. Engler placed *Streptothrix, Cladothrix, Actinomyces,* and *Nocardia* under the family Chlamydobacteriaceae, including all of these genera under the name *Sphaerotilus* Kützing.

Sphaerotilus: (Kützing) emend. Buchanan, 1918.

J. Bact., v. 3, no. 3, Baltimore, 1918, pp. 303 and 305. Filaments of rods or oval cells, attached, colorless, showing pseudodichotomous or false branching; multiplication by motile (swarm cells) and nonmotile conidia, the former with a clump of flagella near one end. Usually without a deposit of Fe_2O_3 in the sheath.

Type species (by inclusion).—*S. natans* Kützing.

Spirillum: Ehrenberg, 1830.

Abhandl. d. Konig. Akad. d. Wissensch. z. Berlin, and idem 1830 (1832) p. 38, and 1831 (1832), p. 68. See also Die Infusionsthierchen, etc., 1838, p. 84, pl. 5, figs. 11–13. Rigid spirals of screw-like form; cylindric; transverse division.

Species.—*S. volutans.* Syn. *Vibrio spirillum* Müller, 1786. Large spirals; amplitude 1/96 inch; body colorless, slightly transparent; spirals of 3 or many turns. This species is the type by absolute tautonymy according to Dr. C. W. Stiles (Bull. No. 24, Hyg. Lab., U. S. Treas. Dept., Washington, Sept., 1905, p. 34), but should be written: *Spirillum spirillum* (Müller).

Spirillum: (Ehrenberg) em. Migula, 1894.

Arb. aus d. Bact. Inst. d. Tech. Hoch. z Karlsruhe, v. 1, h. 2, 1894, p. 236. Cells screwlike, twisted, rigid rods of various thicknesses, length and height of the spiral, forming only a portion of a turn, or a long screw. Endospores in some species. Cells motile by means of a tuft of polar flagella, mostly half circular, rarely wavy-bent.

Type species (subsequent designation by Committee, Am. Bact. Soc., in J. Bact., v. 5, no. 3, May, 1920, p. 204).—*Spirillum undula* (Müller, 1786) Ehrenberg.

Spirillum: Oken, Verm., 1815. According to Scudder, zool. nomen., 1882, p. 298.
Spirillum: Eichw., Polyg., 1844. According to Scudder, zool. nomen., 1882, p. 298.

Spirobacillus: Metchnikoff, 1889.

Ann. l'Inst. Pasteur, v. 3, No. 2, 1889, p. 62, pl. 1.

Type species (monotypy).—*S. cienkowskii.* Pleomorphic. 1. Ovoid cells, more or less elongated, 3 to 5μ, resembling certain species of yeasts (in division the segments are unequal and remain together). 2. Straight rods with rounded ends. 3. Large curved rods. 4. Spirillum forms. 5. Small curved rods. 6. Thin filaments. 7. Spores. Habitat: Parasitic on *Daphnia magna*, coloring the crustacean bright red. Trevisan (Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1019) states that this species is synonymous with *Pacinia cienkowskii.*

Spirochaeta: Ehrenberg, 1834.

Abhandl. d. König. Akad. d. Wissensch. z. Berlin, 1833 (1835), p. 313. See also Die Infusionsthierchen, etc., 1838, p. 83, pl. 5, fig. 10. Spirochaeta: Schlingenthierchen. Family of Zitterthierchen, Vibrionia. Character gen.: Polygastricum (?), anenterum Gymnicum, nec loricatum. Corpus filiforme, contractione non incrassatum, sed flexuosum, sponte in multas partes transverse dividum, spiram angustam, filiformen, plicatilem contortum.

Type species (monotypy).—*Spirochaeta plicatilis.* Vermiform, twisted animals. S. corpore spirali plicatilique, tenuissimo, spirae anfractibus ipso corpore vix duplo lasioribus, angustissimis, numerosissimis. In 1838: Sp. corpore tenuissimo subgloboso, cochleae filiformis longae anfractibus angustissimis numerosissimis, colore hyalino. Divisione spontanea imperfecta in catenam tortuosam s. cochleam filiformen flexibilem elongatum.

Spirochaeta: (Ehrenberg) emend. Hueppe, 1886.

Die Formen der. Bakt., Wiesbaden, 1886, p. 148. Long, spiral, flexible filaments without endospores. Arthrospores or "unknown fructification."

Spirochaeta: Lehmann and Neumann, 1896.

Atlas and Principles of Bacteriology (Trans. by Weaver), Philadelphia, 1901, p. 126. Flexible, long, spiral, coiling threads. Flagella unknown.

Spirochaeta: (Ehrenberg) emended Zuelzer, 1911.

Archiv. f. Protistenk. v., 24, 1911–12, p. 51.

Type species (same type).—*S. plicatilis.* A highly flexible organism, usually living anaerobically. The spirally wound protoplasm is traversed by a straight, elastic, "achsenfaden," and contains regularly divided volutin granules. No morphologically differentiable membrane or periplast present. Circular in cross-section. Zuelzer thinks it belongs between the Schizophytes and Flagellates. She distinguishes it from *Cristispira* by the fact that *Cristispira* is surrounded by an elastic, double-contoured cell-membrane, and possesses unilaterally a plasma-like crista "von einen contractile Randfibrille durchzogen wird auf." The characteristic difference between *Spirochaeta* and the spirilla is the possession by the latter of a rigid cell membrane and flagella, also "zentrale, fadenartige anordnungen stark farbige substanzen erweisen sich stets als zentralkorperartig aus einzelnen Körnchen zusammengesetzt und zergten kein Homologon zum einheitlicher elastischen achsenfadender Spirochaeten." In brief, according to Zuelzer the chief characteristics of *Spirochaeta* are: Spiral structure, "achsenfaden," volutin granules, solubility in trypsin, lacking a morphologically differentiable cell-membrane, and cross-division.

Spirochaeta: (Ehrenberg) em. Winslow, Broadhurst, Buchanan, Krumwiede, Rogers and Smith, 1917.

J. Bact., v. 2, no. 5, 1917, p. 563. Nonparasitic, with flexible, undulating body and with or without flagelliform, tapering ends. Common in sewage and foul water.

Type species (same type).—*S. plicatilis* Ehrenberg.

Spirochaeta (Ehrenberg) em. Buchanan, 1918.

J. Bact., v. 3, no. 6, 1918, p. 313. Slender, spiral cells living free, usually in water containing hydrogen sulfide. Actively motile, flexuous. Flagella unknown. Anaerobic. Protoplasm is spirally wound around a flexible or elastic axis filament. Volutin granules regularly present in the plasma. No differentiation of exterior. Cell circular in cross section.

Type species (same type).—*S. plicatilis* Ehrenberg.

Spirochaeta: Sars, Verm., 1856.
According to Scudder, Nomenclator Zool. Univ. Index, 1882, p. 298.

Spirochaete: Cohn, 1872.

Beit. z. Biol., d. Pflanz., v. 1, Breslau, 1872, p. 224, 1875, p. 204. Variant of *Spirochaeta* Ehrenberg. Cohn (1854) placed *S. plicatilis* under the algal genus Spirulina.

Spirochoeta: Dujardin, 1841.

Hist. Nat. des Infusoires. Dujardin. Paris, 1841, p. 225. Variant of *Spirochaeta* Ehrenberg.

Spirodiscus: Ehrenberg, 1828.

Symb. Physicae. Animalia evertebrata. Decas Prima. Berlin, 1828, p. 34. See also Abhandl. Kaiserl. Akad. z. Berlin (1831, 1832), p. 68, and idem., 1830 (1832), p. 65. Animal e familia Vibrionorum. Div. spontanea imperfecta (et obliqua?) in catenam filiformen s. cochleam rigidam disciformem, accrescens.

Species.—*S. fulvus.* Sp. cochlea lenticulari, obsolete articulata, fulva, 1/50 mm. partem fere lata.

Spirodiscus: Stein, Mollusca, 1850. Scudder, Zool. Nomenclator. U. Index, 1882, p. 298.

Spiromonas:[1] Perty, 1852.

Zur Kenntniss Kleinster Lebensformen, Bern, 1852, p. 171.

Type species (monotypy).—*S. volubilis.* Syn. (?) (Perty) *Cyclidium distortum* Davaine. Colorless, transparent, 1/500 to 1/110 inch long, a very delicate "Monadine" whose leaf-like body has many fine windings about its long axis. Motile. Rounded ends.

Spiromonas: Engler and Prantl in Die Naturlich. Pflanzenfamilien, Teil 1, Abt. 1*a*, 1896–1900, p. 186, give the species *Spiromonas distortum* Kent, and place it among the Flagellata.

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[1] Ellis (in Cent. f. Bakt. Abt. 2, v. 19, 1907, p. 517) connects *Spiromonas cohnii* with his *Spirophyllum ferrugineum* among the thread bacteria.

Spironema:[1] Vuillemin, June 5, 1905.

Compt. Rend. Acad. d. Sci., Paris, v. 140, 1905, p. 1567. Renames *Spirochaete pallida: Spironema pallidum.* "While submitting to the necessity of creating a new generic name for the animal forms which resemble the Spirochaetes, we think that it is well to keep the same radical in order to recall the similarity which struck Schaudinn. We propose the name of *Spironema* for the Protozoaires spiralés à bouts aigus, qui diffèrent des Trypanosomes par la réduction de l'apparatus nucléaire, de la membrane ondulante et de son prolongement flagelliforme. Le Spirochète pâle deviendra ainsi, dans nomenclature régulière, le *Spironema pallidum.*" [Type.]

Spironema: Klebs, 1893.

Zeit. f. wissensch. Zool. 1893, 5. A flagellate.

Spironema: Meek, 1864, Smithsonian Inst. Check List. Invert. Fossil snail.

Spirophyllum: Ellis, 1907.

Proc. Roy. Soc. Edinburg, v. 27, Edinburg, 1907, p. 21. See also v. 28, p. 338, and Centralbl. f. Bakt., Abt. 2, v. 19, 1907, p. 507.

Type species (monotypy).—*S. ferrugineum.* Body of cell elongated, flattened, and spirally twisted. Number of spiral turns may vary from a quarter turn to 15 or more. Width varies from 1 to 6μ. Length may reach 200μ. Middle portion of the cell about 0.25μ thick, edge 0.5μ. No definite membrane, but edge is thickened so as to form a sort of rampart all around the cell. Ends are usually irregular, angular, and unsymmetrical. Spirals close or wide apart. Spiral lengths 3 or 4 times greater than the width. Multiplication by formation of conidia (external constriction), oval, 1μ by 1.75μ. Conidia formed before twisting begins. Ferric hydroxide deposited on its surfaces. Found only in iron water. See *Gallionella*, and *Leptothrix.*

Spirophyllum: Schindler, 1905.

Cited by Buchanan in J. Bact., v. 3, no. 3, Baltimore, 1918, p. 302.

Spiroschaudinnia: Sambon, 1907.

According to Tropical Diseases. Manson. Fourth Ed., New York, 1907, p. 833. Manson places this genus, along with *Treponema* and *Leutocytozoön* under the group *Spiroschaudinnidae* Sambon, 1907, stating: "Unfortunately our knowledge of the Spiroschaudinniae is very imperfect, and their biological position is a matter of controversy. The majority of observers believe them to be bacteria, asserting that they multiply by transverse division, that they possess numerous flagella, and that they are plasmolysed by solutions of NaCl and alkalies. Others contend that they are protozoa, that they multiply by longitudinal division, have no flagella, are not plasmolysed by solutions of NaCl and alkalies, and do not grow on ordinary culture media." Manson considers them to be haemoprotozoa. In the blood of the vertebrate host, the schizonts are minute, wavy or spirally twisted threadlike bodies of uniform length. According to Schaudinn and Prowazek they possess an undulating membrane, but no flagella. Their nuclear apparatus is composed of from 6 to 8 chromatic granules arranged along an axial thread. Schizogony takes place by longitudinal division, but the resulting forms may remain attached end to end for some time, either twisted up together or placed in the same line. Sometimes more than 2 individuals are connected in this way, and their ultimate separation gives the impression of transverse division. The free phase alternates with an endocorpuscular resting phase which occurs within the internal organs of the host, the parasite coiling itself up within the host-cell. In the later stages of infection, relatively long, thick forms have been observed; they may represent sporonts. The parasites have been found in great numbers within the ova of infected ticks. Syn. (Manson): *Spirochaeta*, Ehrenberg, pro parte; *Spirochaete* Cohn, pro parte. Also synonymous (Buchanan) with *Treponema* Schaudinn.

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[1] As to the validity of this genus see Dobell, Med. Res. Com., Special Report Series, No. 19, London, 1918. Dobell regards the organism first named by Schaudinn *Spirochaete pallida* as belonging to the plant kingdom, and considers that *Spironema* is valid because of priority.

Species (included here by Manson).—*S. recurrentis* (Lebert, 1874). Cause of relapsing fever in man. Schizont 7 to 9μ long by 0.25 to 0.3μ broad. *S. duttoni* (Novy and Knapp, 1906); *S. anserina* (Sacharoff, 1891); *S. gallinarum* (Blanchard, 1905); *S. theileri* (Laveran, 1904); *S. ovina* (Blanchard, 1906); *S. jonesi* (Dutton, Todd and Tobey, 1906).

Spirosoma: Migula, 1894.

Reference same as for *Planococcus*, p. 237. Family *Spirillaceae* Migula. Cells, twisted, screwlike, nonmotile, without flagella, rigid. Division in but one direction. Single, free or in small gelatinous colonies.

Type species (monotypy).—*S. lingualis* (Weibel) Migula.

Spirulina: Bory, Polyg., 1824.

Univ. Index to Genera. in Zool., p. 299. In Nomenclator Zool. Scudder, Washington, 1882.

Spirulina: Turpin, 1827.

An alga belonging to the Oscillatoria. See Dict. d'Hist. Nat. de Levrault, v. 50, 1827, p. 309.

Spirulina: Ehrenberg, Polyg., 1839.

According to Scudder in Nomenclator Zool., Washington, 1882, p. 299.

Spirulina: Hueppe, 1885.

Die Formen d.Bakt., Hueppe. Wiesbaden, 1885, p. 148. Rods in the form of straight threads, wavy or screwlike, no endospores. Syn. (Hueppe) *Proteus* Hauser.

Spirulina: Cohn, 1854.

N. Acta. Acad. Leop.-Carol, v. 24, Breslau, 1854, 1, p. 125, plate 15, f. 10–11. Renames Ehrenberg's *Spirochaeta plicatilis: Spirulina plicatilis* (Ehrenberg) Cohn.

Sporonema: Perty, 1852.

Reference as for *Spiromonas*, Perty, pp. 160, 179, and 181.

Type species (monotypy).—*S. gracile:* An exceedingly small, cylindrical, nonsegmented hollow thread, inclosing at one end (rarely at both) one, sometimes even two elliptical little bodies (wohl Sporen). Threads 1/80 inch long, 1/1000 inch broad, very slightly greenish, often found with *Metallacter bacillus*, which it very much resembles, yet always nonsegmented. Motile. Sometimes the spore is broader than the thread. When 2 spores are present "so liegen sie hintereinander oder an den Enden." Hueppe (Prin. Bact. Trans. by Jordan, 1899, p. 29) says it probably belongs to the "swamp bacteria."

Sporonema: Desmatière, 1847. A fungus, belonging to the Hyalosporae.

Sporosarcina: Jensen, 1909.

Centralbl. f.Bakt., Abt. 2, v. 22, 1908–9, p. 340. See also v. 24, 1910, p. 477. Spore-forming cocci of the genus *Sarcina*.

Sporospirillum: Jensen, 1909.

Reference as for *Sporosarcina*. Spirilla forming spores.

Sporothrix: Kligler, 1917.

J. Bact., v. 2, March, 1917, Baltimore, p. 165.

Sporothrix: *S. schenckii*, etc. A fungus genus.

Staphilococcus: De Grazia, 1903.

La Riforma Med., v. 19, Naples, 1903, p. 710. Variant of *Staphylococcus.*

Staphylococcus: Ogston, 1882.

J. Anat. and Phys., v. 17, 1882–1883, London, p. 27. The grouped form of *Micrococcus.* Found very often with the chain form, yet the two are different and neither form passes over into the other. Thinks the species studied is etiologically connected with infectious osteomyelitis, etc.

Staphylcoccus: (Ogston) emend. Rosenbach, 1884.

Mikroorg. bei den Wundinfectionsk. des Menschen, Rosenbach. Wiesbaden, 1884, pp. 18–21, 5 pls.

Species.—S. pyogenes aureus: A very small coccus; spherical; yellow; pathogenic to man and animals. *S. pyogenes albus.* As above, but white.

Staphylococcus (Ogston, Rosenbach) emended Winslow, Broadhurst, Buchanan, Krumwiede, Rogers and Smith, 1917.[1]

J. Bact., v. 2, Nos. 5 and 6, 1917, pp. 508 and 612. Usually parasitic, cells as a rule in irregular groups or short chains, rarely in true packets, usually Gram-positive. Growth fair to good on the surface of artificial media. Sugars as a rule fermented with acid. Gelatin commonly liquefied. Nitrates may or may not be reduced. Pigment orange or white.

Type species (by inclusion).—*S. aureus* Rosenbach.

Staphylokokkus:

Klebs, Hüppe, and many other German writers, e. g., see Forts. d. Med., 1885, v. 3, p. 203.

Stigmatella: Berkeley and Curtis, 1857.

Berkeley: Introduction to Cryptogamic Botany, London, 1857, p. 313, Fig. 70. No description on this page, only the figure, under which is the legend: "*b. Stigmatella aurantiaca,* Berkeley and Curtis. From specimens on *Sphaeria hibisci,* South Carolina." On p. 314, however, he included both *Chondromyces* and *Stigmatella* under the tribe Isariei. Fr. (spelled Isariacei, Cda, on p. 304) his highest group of the Hyphomycetes. This group is described as follows: Fertile threads, compacted, sometimes replaced by cells. Common receptacle or stem (or stroma) compound. The dry, volatile, spores are found terminating the threads and cells. He later states that in reality *Chondromyces* and *Stigmatella* are "compound mucedines."

Streblotrichia: Guignard, 1890.

Compt. Rend. Soc. Biol., v. 2, ser. 9, Paris, 1890, p. 124.

Type species (monotypy).—*S. bornetii.* Gross appearance: Colorless gelatinous masses, which through desiccation become very hard, and are at times about the size of a pinhead. These zoogloea masses, fixed on the rocks, are composed of a great number of filaments, of indefinite length, rectilinear at their bases, then curved, wound, and bent in all directions, especially at the margins of the gelatinous mass, in which they are embedded. Possess a rather thick membrane. Each filament is made up of cylindrical cells, very uniform and of 1μ in diameter, and not very much longer. Finely granular content. Growth of the filaments is intercalary. No endospores. No arthrospores. Habitat: In the fissures of rocks bathed by the sea.

Streptobacillus: Hlava, 1889.

Sbornik Lekaisky. (Arch. Bohêmes de Méd.) v. Praze, 1889–90, p. 139. A short bacillus in short chains, 0.9μ to 1.2μ by 1.87μ to 2μ. Hlava states that it is the cause of typhus exanthematicus.

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[1] See Winslow, Rothberg, and Parsons in J. Bact., v. 5, No. 3, 1920, p. 161, where they state that *S. aureus* may be regarded as the type. "All the other types may be assumed to have been derived from this one."

Streptobacillus: Pfeiffer, 1889.
According to Flügge: Die Mikroorganismen, v. 2, 1896, p. 452: *S. pseudotuberculosis rodentium.*

Streptobacillus: Unna, 1892.
Monats. f. Prakt. Derm., v. 14, No. 12, p. 485. See also v. 21, No. 2, 1895, p. 61, and Gior. Ital. d Mal. Veneree, Anno 30, Milano, 1895, p. 275.

Species.—S. ulceris mollis. Present intracellularly in venereal ulcer. Rods 1.25 to 2μ by 0.3μ broad. Characterized by chain formation. In old chancres wavy chains of 100μ were found. Chains usually of 4 to 10 individuals.

Streptobacillus: Rist and Khoury, 1902.
Ann. l'Inst. Past., v. 16, Paris, 1902, p. 70.

Species.—S. lebensis. Straight rods with square ends, not motile, no capsule, 6 to 8μ long by 0.5μ wide. Rather long chains common. Occurring in Egyptian "leben"—a fermented milk.

Streptobacter: Schröter, 1886.
Krypt.-Flora v. Schlesien. Cohn, v. 3, Pilze, Breslau, 1885–1889, p. 156. A subgenus of *Bacillus*. Growth of the cells prior to spore formation into long threads.

Species.—Bacillus (Streptobacter) erythrosporos (Cohn, 1879), *B. (S.) subtilis*, and three other species.

Streptobacteria: Billroth, 1874.
Reference as for *Coccos* Billroth, pp. 18 and 19, pl. 4, figs. 31–34. Rods in fine, long chains. Individual members may be plainly distinguished. Definite point of union.

Species.—S. gigas. Nonmotile rod occurring in chains. *S. pericardii* (p. 61). Syn. (?) *S. gigas pericardii* (p. 60). Developing in pericardial liquid.

Streptobacterium: Billet, 1890.
Reference as for *Diplobacterium* Billet. Rectilinear bacterial elements in chains.

Streptobacterium: Jacqué and Masay, 1912.
Centralbl. f. Bakt., Abt. 1, orig., v. 62, 1912, p. 181.

Type species (monotypy).—*S. foetidum:* A short rod with rounded ends. Very motile, no spores. Chains in bouillon cultures. Gram negative. Pathogenic to man. Found in sputum, plural exudate, etc.

Streptococcos: Billroth, 1874.
Untersuch. u. die Vegetationsformen von Coccobacteria Septica, etc. Berlin, 1874, p. 10; pl. 1. Round or oval cells of irregular dimensions, in chains; division in one direction, the cells remaining united after division to form short chains.

Streptococcus (Billroth) emend. Rosenbach, 1884.
Mikroorganismen bei den Wundinfectionskrank. des Menschen. Wiesbaden, 1884, p. 22. Cocci in chains. "Wollem wir einen Coccus, welcher sich aus mehrere Einzelcoccen zu characteristischen Reihen, Ketten, Eingeln oder rosenkranzähnlichen Figuren gruppirt mit Ogston, welcher Billroth's Nomenklatur acceptirt hat, Streptococcus nennen, so bezeichnet auch hier dieses Wort nur eine Gattung; denn es gibt mehrer Artem, welche sich mikroskopisch in gleicher Weise zu Ketten anordnen."

Species.—S. erysipelatos, the organism described by Fehleisen as the cause of erysipelas, and *S. pyogenes* Rosenbach, the pus-producing coccus. Migula (Syst. der Bakt. v. 2, 1899–1900, p. 6) says these two species are synonymous.

Streptococcus: (Billroth, Rosenbach) emended Winslow and Rogers, 1905.

Science, n. s., v. 21, 1905, p. 669. See also J. Inf. Dis., v. 3, 1906, pp. 485–546, and The Systematic Relationships of the Coccaceae, Winslow and Rogers, New York, 1908. Parasites. Cells normally in short or long chains; under favorable conditions, sometimes in pairs and small groups, never in large packets. Generally stain by Gram. On agar streak, effused translucent growth, often with isolated colonies. In stab culture little surface growth. Sugars fermented with formation of large amount of acid. Generally fail to liquefy gelatin or reduce nitrates.

Type species (subsequent designation by Com. Soc. Am. Bact. in J. Bact., v. 5, no. 3, 1920, p. 206).—*S. pyogenes* Rosenbach.

Streptokokkus: Klebs, Hueppe, 1885–1887, and other German authors.

Klebs (Die Allg. Path., Jena, 1887, p. 318) used it with species names. *S. erysipelatosus*, *S. pyogenes*, etc.

Streptospirillum: Billet, 1890.

See reference for *Diplobacterium*, p. 24. Spiral forms of "elements bactériens." Spirilla in chains.

Streptothrix: Corda, 1839.

Pracht.-Flora Europaeischer Schimmelp., A. J. Corda, Leipzig and Dresden, 1839, p. 27. *S. fusca.* A fungus closely related to *Botrytis.*

Streptothrix: Cohn, 1875.

Beit. z. Biol. d. Pflanzen, v. 1, Heft 3, Breslau, 1870–1875, p. 186, and 204. Filamenta leptotrichoidea tenerrima achroa nonarticulata stricta vel anguste spiralia, parce ramosa.

Type species (monotypy).—*S. foesteri.* Filamenta in Micrococco mucoso nidulentia, concretiones in canaliculo lacrimali hominis raro repertas componentia.

Streptothrix: (Cohn) em. Musgrave and Clegg, 1908.

The Philippine J. of Sci., v. 3, B. Med. Sci., Manila, 1908, p. 476. "A group of branching, filamentous microorganisms which logically belong to a single genus. The generic name is variously given as Streptothrix, Actinomyces, or Nocardia; the last of these names is probably scientifically the most correct, but because of the present botanical confusion and uncertainty the first is here employed, because of its more general acceptance." Branching, filamentous organisms, which develop slowly into colonies made up of the branches and their "transformation products." These colonies vary in color, size, and consistency, and when stained show various changes in different portions. The filaments at the periphery are usually intact, with or without club formation, and the terminals may or may not be radially placed. Toward the center of the colony, or granule, coccus and bacillus-like irregular forms occur, together with crystals and nonstaining detritus. The majority of these organisms may be cultivated on artificial media, some of them pathogenic to laboratory animals.

"Morphologically these parasites are rather closely related to some of the branching bacteria." The young filaments vary in width from 0.5 to 1μ and in length from 5 to 20μ or more. Stain homogeneously, and some strains are acid fast. All strains more or less Gram positive. Causing streptothricosis (Actinomycosis, Nocardiosis) in man and animals. See *Discomyces.*

Strickeria: Stempell, 1916.

Deutsche med. Woch., v. 42, April 13, 1916, p. 439.

Type species.—*S. jurgensi* n. g. n. sp. An organism isolated from the intestinal tract of the body louse taken from typhus fever patients. Stempell thinks it is the cause of typhus fever, and that it probably belongs to the protozoa, somewhere near *Babesia* or *Leishmannia*. Pleomorphic—frequently very small, coccus-like forms are found which may or may not contain a brownish pigment. Comma-like forms, and spindle-shaped in which both ends are delicately pointed—flagella like—not infrequent. With the Giemsa stain there are often seen darker red, nucleus-like bodies centrally located within the cell. The comma-like forms average 2μ in length.

Streptomicrococcos: Billroth, 1874.

Untersuch. u. die Vegetationsformen v. Coccobacteria septica, Berlin, 1874, p. 11. Micrococcos in chains—snakelike, practically nonmotile.

Sulfomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908, 1909, p. 314. Short rods capable of oxidizing sulfur and sulfur compounds. Renames *Thiobacillus* Beijerinck.

Species.—*S. denitrificans* (Beijerinck) Jensen; *S. thioparus* Beijerinck.

Termobacterium: Lindner,[1] (?).

According to Beijerinck (Centralbl. f. Bakt., Abt. 2, v. 4, 1898, p. 211). Zikes (Mitt. d. Öster. Vers.-St. f. Brauind. Wien, 1903, Heft 11, p. 20) gives the species: *Termobacterium album* Lindner. See *Thermobacterium.*

Termobacterium: Zeidler, 1896.

Centralbl. f. Bakt., Abt. 22, v. 2, Jean, 1896, p. 729, 2 figs. Usual form is a rod in pairs end to end. Involution forms frequent. Belongs to the "acetic acid bacteria"; organisms capable of producing acetic acid from certain substances. States that he follows Lindner in naming the organism.

Tetracoccus: Billet, 1890.

See reference for *Diplobacterium*, p. 24. Micrococci in pairs, the pairs in groups of two.

Tetracoccus: Klecki, 1894.

Centralbl. f. Bakt., Abt. 2, v. 15, 1894, pp. 354–362.

Type species (monotypy).—*T. butyri.* Diplococci united in twos, or in chains and heaps. The pairs of cocci measure about 15μ long and 1μ thick. Habitat: Rancid butter.

Tetrakokkus: Klebs, 1887.

Die Allg. Path. Edwin Klebs. Jena, 1887, p. 337.

T. variolae. The cause of variola. Very characteristic arrangement. Diameter usually about 0.6μ.

Tetradiplococcus: Bartoszewicz and Schwarzwasser, 1908.

Centralbl. f. Bakt., Abt. 2, v. 21, 1908–9, p. 614. A Diplococcus, showing tetrad grouping. The diplococci resemble gonococci in their biscuit-like form. The tetrads (4 to 6μ in diam.) are either in squares or rhombi, and usually 2, 3, or more are confined. The tetrads show motility, but no flagella were stained.

Type species (monotypy).—*T. filiformis lodzensis.* Found in "lodzer Brunnenwasser."

Tetragenus: Kruse, 1896.

Die Mikroorganismen. Flügge, v. 2, Leipzig, 1896, p. 94. A coccus showing typically arrangement into tetrads. Placed it as a group under *Merista.*

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[1] Lindner's paper is not available.

Tetragenus: Vincenzi, 1897.

La Riforma med., 1897, p. 758. According to Centralbl. f. Bakt., Abt. 1, v. 24, Jena, 1898, p. 193.

Species.—*T. citreus.* A facultative anaerobe isolated from the intermaxillary lymph gland of a child.

Tetragenus: Altana, 1909.

Centralbl. f. Bakt., Abt. 1, v. 48, Jena, 1909, p. 44.

Species.—*T. tardissimus.* A nonmotile oval coccus arranged in tetrads surrounded usually by a capsule. Gram positive. Isolated from the blood in a contagious disease of guinea pigs.

Thermoactinomyces: Tsiklinksy, 1898.

Ann. de Microg. v. 10, Paris, 1898, p. 286. See also Ann. de l'Inst. Past., v. 13, Paris, 1899, p. 500.

Type species (monotypy).—*T. vulgaris.* Branched filaments, the branches about 0.5μ long. Spores appear at the end of the filaments as round as ovoid swellings, increasing in size, becoming free finally. Grows from 48° to 68° C. Best at 57° C. Found it in various substances: Earth, hay, straw, different cereals, etc.

Thermobacillus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1908–9, p. 339. Thermophilic, spore-forming, peritrichiate, aerobic bacilli.

Thermobacterium: Fuhrmann, 1905.

Variant of *Termobacterium* Lindner. Beihefte z. Bot. Cent., 2, v. 19, Leipzig, 1905, p. 8. See also Centralbl. f. Bakt., Abt. 2, 1897, p. 770 (index): *T. aceti.*

Thiobacillus: Beijerinck, 1904.

Centralbl. f. Bakt., Abt. 2, v. 11, 1904, p. 593.

T. thioparus.—Small, thin, short rods, 3 to 3.5μ. Very motile. No spores. Organism occurs in fresh water and is capable of using carbonates as a source of C, with H_2S, $Na_2S_4O_6$, etc., as sources of energy.

Thiobacillus denitrificans.—Similar morphologically to *T. thioparus*, but effects the reduction of carbonates through free S as a source of energy with denitrification.

Thiocapsa: Winogradsky, 1888.

Beitr. z. Morph. u. Physiol. d. Bacterien. Leipzig, 1888, Heft 1, p. 84. Cells round, nonswarming, united into families by means of a gelatinous membrane, which splits upon growth of the family. Cells divide in 3 directions. Belong to the "red sulfur bacteria." Usually rose-red in color. Rich in S granules.

Type species (monotypy).—*T. roseo-persicina* nov. gen. et spec. Cells are 1.1 to 2μ in diameter.

Thiococcus: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 330. Belonging to the family *Thiobacteriaceae*, colorless sulfur bacteria. Nonfilamentous cocci.

Thiocystis: Winogradsky, 1888.

Beit. z. Morph. u. Phys. d. Bact. v. Winogradsky. Heft 1, Leipzig, 1888, p. 60. Cells spherical and united into small families surrounded by a gelatinous cyst. Sometimes a single individual is surrounded by such a cyst. Capable of swarming. Measure 1 to 5μ in diameter. Cells divide in 3 directions. Cell-content granular. Bacteriopurpurin present. Red sulfur bacteria.

Type species (subsequent designation by Buchanan in J. Bact., v. 3, No. 5, Balto., 1918, p. 466).—*T. violacea* Winogradsky. 2.7 to 5.2μ. Bright red or red violet in color.

Thioderma: Miyoshi, 1897.

J. College of Sci., Imp. Univ. of Tokyo, 1897, p. 143, fig. 19.

Type species (subsequent designation by Buchanan in J. Bact., v. 3, no. 5, Balto., 1918, p. 468).—*T. roseum* Miyoshi. Spheroidal cells, 2.5 by 1.5μ, colored bright red with small S granules. Cells united by means of thin purple-red membrane; capable of swarming. Habitat: moist soil.

Thiodictyon: Winogradsky, 1888.

Reference as for Thiocystis, p. 80. Rod-shaped cells, with ends united to form a net. Compact families may spread out to form a Hydrodictyon-like arrangement. Cells divide in but 1 direction. Families multiply by division or rarely by separation of slowly motile small cell colonies (5 to 15 cells). Bacteriopurpurin and S granules present.

Type species (monotypy).—*T. elegans.* Slender, spindle-shaped rods with pointed ends, 5μ long by 1.7μ thick. Vacuole present. Small S granules. Rods almost colorless.

Thiomonas: Jensen, 1909.

Centralbl. f. Bakt., Abt. 2, v. 22, 1909, p. 330. Belonging to the *Thiobacteriaceae*, colorless sulfur bacteria. Nonfilamentous rods.

Thiopedia: Winogradsky, 1888.

Reference as for *Thiocystis*, p. 85. Cells spherical. Division in two directions of space. Cells united into families which are tabular, i. e., the cells are arranged in fours united by a gelatinous substance. Capable of swarming. Contains S granules and bacteriopurpurin.

Type species (monotypy).—*T. rosea.* Syn. (Winog.) (?) with *Erythroconis littoralis* Oersted, and *Merismopedia littoralis* Rabenhorst described by Warming. Cells 1.1 to 2μ in diam. Very pale color; when in thick layers slightly rose-red.

Thiophysa: Hinze, 1903.

Ber. d. deut. Bot. Gesellsch., Heft 1, v. 21, 1903, p. 309. Spherical cells, laden with sulfur drops, surrounded by a membrane giving pectin reaction. Large vacuole centrally located. No nucleus. No flagella. Multiplication by fission, the daughter cells at first biscuit-shaped.

Type species (monotypy).—*T. volutans* n. sp. Diameter 7 to 18μ. Slow, circular motion. Habitat: Gulf of Naples, near Castellamare in fine sand.

Thioploca: Lauterborn, 1907.

Ber. d. deutsch. Bot. Gesellsch., v. 25, 1907, p. 242. Family *Beggiatoaceae.* Threads Beggiatoa-like, with true sulfur granules; motile; cells often arranged in parallel manner in bundles, etc. A colorless gelatinous sheath is present, usually encrusted with slime particles, and showing circular constrictions.

Type species (monotypy).—*T. schmidlei.* Cells 5 to 9μ thick, and 1 to 1.5 times as long. Habitat: sea beds, near Ermatingen.

Thiopolycoccus: Winogradsky, 1888.

Reference as for *Thiocystis*, p. 79. Cells spherical or elliptical, closely pressed together to form solid families, which are nonmotile. The cells divide in 1 direction and are about 1.2μ in diameter. Multiplication of the colonies by a loosening up of the surface which gradually breaks up into short threads and folds, which continue to form still smaller heaps. No zoogloeae as in *Lamprocystis*.

Type species (monotypy).—*T. ruber*. Swarming not observed. Brightly colored, small, round cells.

Thiosarcina: Winogradsky, 1888.

Reference as for *Thiopolycoccus*, p. 105. Red sulfur bacteria. Cells divide in 3 directions, and are united into families, which are packet-shaped. Do not swarm. Bacteriopurpurin present.

Type species (monotypy).—*Thiosarcina rosea* (Schröter) Winogradsky.

Thiosphaera: Miyoshi, 1897.

Reference as for *Thioderma*. Cells sphaero-ellipsoidal, 5 to 7μ; light violet color; united into families by a colorless gelatinous substance. Sulfur granules rather numerous. Capable of swarming.

Type species (monotypy).—*T. gelatinosa*.

Thiosphaerion: Miyoshi, 1897.

Reference as for *Thioderma*. Cells sphaero-ellipsoidal, about 1.8 to 2.5μ diameter. Violet in color. Very small S granules. Cells bound by a gelatinous substance into solid round families capable of swarming.

Type species (monotypy).—*T. violaceum* Miyoshi.

Thiosphaerella: Nadson, 1914.

J. Microbiologie (Russian), v. 1, No. 1–2, Petrograd, 1914, pp. 52 and 70.

Type species (monotypy).—*T. amylifera*. A sulfur bacterium. Cells are round or slightly elliptical, measuring 4.8 by 6μ. A very thick cell membrane enveloped in a colorless gelatinous layer. Protoplasm sometimes has a gray-green color, and in it are found sulfur granules, and a substance resembling starch. Motile. Multiplication by transverse division. Found frequently associated with *Thiophysa* Hinze and *Achromatium* Schewiakoff.

Thiospira: Wislouch, 1914.

J. de Microbiologie (Russian), v. 1, No. 1–2, Petrograd, 1914, p. 50. Motile, colorless, slightly curved sulfur spirilla with pointed ends. Sulfur granules present. A few polar flagella. *T. winogradskii* (Omélianski). A giant sulfur spirillum 3.5μ by 50μ. *T. bipunctata* (Molisch). Small, very delicately curved sulfur spirilla 1.7 to 2.4μ by 6.6 to 14μ long.

Thiospirillum: Winogradsky, 1888.

Reference as for *Thiocystis*, p. 104. Cells free, capable of swarming at any time, and spirally twisted like the genus *Spirillum;* cells contain sulfur granules.

Type species (monotypy).—*T. sanguineum* (Ehrenberg) Winogradsky.

Thiothece: Winogradsky, 1888.

Beit. z. Morph. u. Phys. d. Bact. v. Winogradsky. Heft 1, Leipzig, 1888, p. 82. Cells united into families by means of a thick gelatinous membrane. Cells capable of swarming and loosely embedded in a gelatinous substance. The cells are coccus-like, about 4μ in diameter, and divide in but one direction. Upon swarming the cells lie still more loosely and swarm out singly. The sulfur granules are small; the cells are gray-violet or weak rose in color, sometimes yellowish. Bacteriopurpurin present.

Type species (monotypy).—*T. gelatinosa.*

Thiothrix: Winogradsky, 1888.

Reference as for *Thiocystis*, p. 29. Filamentous cells; threads attached; of irregular thickness and enveloped in a delicate membrane. Nonmotile. Cell contents have many sulfur granules. Reproduction through rod-shaped conidia which are slowly motile. These conidia are produced at the ends of the threads. They attach themselves by means of a slime cushion extruded at the base, then grow into new threads.

Type species (subsequent designation by Buchanan in J. Bact., v. 3, No. 5, Baltimore, 1918, p. 463).—*T. tenuis.*

Thiotrix: Schmidt and Weis, 1902.

Die Bakt., Jena, 1902, p. 92. Variant of *Thiothrix* Winogradsky.

Torula: Persoon, 1801.

Defined as a fungus. Changed to *Oospora* by Wallroth 1833. Trevisan (Saccardo's Syll. Fung., v. 8, 1889, p. 1021) says *Torula aceti* Sacc. (Atti. Soc. Ven. Trent. v. 1878, p. 315) is synonymous with *Bacterium aceti.*

Treponema:[1] Schaudinn, October 26, 1905.

Deut. med. Wochnschr., No. 43, v. 31, pt. 2, 1905, p. 1728. See also No. 42, p. 1665. In the earlier reference Schaudinn discusses the morphology of his *Spirochaete pallida*, and accepts Vuillemin's designation: *Spironema.* However, on p. 1728 he says: "Nach Absendung des Manuskripts meines in no. 42 veröffentlichten Aufsatzes 'Zur Kenntnis der Spirochaete pallida' teilte mir Herr Prof. Lauterborn mit, dass der von Vuillemin vorgeschlagene Gattungsname *Spironema* bereits von Klebs (Zeits. f. wissensch. Zool., 1893, v. 55) für einen anderen Flagellaten vergeben sei. Ich schlage deshalb statt dessen den Namen *Treponema* vor."

Type species (monotypy).—*Treponema pallidum.*

Treponema: (Schaudinn) em. Winslow, Broadhurst, Buchanan, Krumwiede, Rogers, and Smith, 1917.

J. Bact., v. 2, no. 5, Sept., 1917, p. 563. Parasitic and frequently pathogenic forms with undulating or rigid spirilliform body. Without crista or columella. With or without flagelliform tapering ends.

Type species (original designation).—*Treponema pallidum* Schaudinn.

Tyrothrix: Ducleaux, 1882.

Ann.l'Inst. Nat. Agronomique, Sér. 1, No. 5, 4ᵉ An., 1879–80, Paris, 1882, p. 79. See also Le Lait. Ducleaux, Paris, 1887, pp. 213–215. Organisms which live in milk, feeding upon the casein with production of casone, leucine, tyrosine, and other protein cleavage products. Author includes: *T. tenuis.* Short, cylindric rods, motile, often remaining united to form chains. Content granular, 0.6μ by 3μ. Aerobic. *T. filiformis, T. distortus,* and 8 others.

Ulvina: Kützing, 1833–1837.[2]

Algarum aquae dulcis germinae, Dec. XII, No. 113. According to J. f. Prakt. Chem. (Erdmann), Bd. 11, 1837, p. 385, and Phycol. Gen. Leipzig, 1843, p. 149. Stratum compactum lubricum ex granulis minutissimis compositum.

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[1] See footnote under *Spironema.*

[2] The whole series. Decas 1 to 16, of this reference was published 1833–1837. It is impossible to obtain this particular number and ascertain exact date.

Type species (monotypy).—*U. aceti.* Primum membranacea, deinde stratum compactum, in ramos dichotomos dense aggregatos verti caliter divisam formans; granulis aequalibus. Trevisan (Sacc. Sylloge Fungorum, v. 8, 1889, p. 1021) says *U. aceti* is syn. with *Bacterium aceti.* In the second reference given above Kützing describes this species, or "essigmutter," as follows: Exceedingly small spheres, 1/2000 to 1/1500 inch diameter, sometimes arranged in series, but usually in a gelatinous mass. From this stage it passes through several changes, a dichotomously branching stage, and a final stage, in which longish bodies appear.

Umbina: Nägeli, 1848.

Gattungen einz. Algen Phys. u. Syst. bearb., Zürich, 1848. See also Amtlich. Ber. u. die drei u. dreisigste versamml. Deut. Natur. u. Ärzte zu Bonn, 1857, p. 133. Gives but a brief description, stating that it is the "mother of vinegar," and very similar to *Nosema bombycis,* except that the cells remain united.

Type species (monotypy).—*U. aceti* (Kützing) Nägeli.

Urobacillus: Miquel, 1889.

Ann. d. Micrographia, v. 1, 1888–89, p. 519. All bacilli which ferment urine.

Type species (monotypy).—*U. pasteurii.* Short motile bacillus about 1μ in length. Later (p. 552) he adds several other species.

Urobacter: Trécul, 1865.

According to Cohn: Beitr. z. Biol. d. Pflanz. 1, 1870–1875, Breslau, p. 188. Cohn states that Trécul placed in this genus "geschwänzten bacterien."

Urococcus: Miquel, 1888.

Reference as for *Urobacillus*, p. 519. Cocci which ferment urine.

Urococcus: Hassall, 1845. Defined it as an alga (fresh water).

Urocephalum: Trécul, 1865.

Compt. rend. de l'Acad. des Sci., v. 61, Paris, 1865, p. 432, and v. 65, 1867, p. 513. The tadpolelike form of *Amylobacter.* Motile, somewhat flexuous; cell stained intense blue with iodine. Found in decaying plant cells.

Urosarcina: Miquel, 1889.

Ann. de Micrographie, v. 1, 1888–1889, p. 519. Species of *Sarcina* which ferment urine.

Vibrio: Müller, 1773.

Vermium terrestrium et fluviatilium, 1773, p. 39. See also Animalcula Infusoria Fluviatilia et Marina, Havniae, 1786, p. 43. Placed the genus in the group of Infusors: *Infusoria crassiuscula*—vermis inconspicuus simplicissimus, teres, elongatus.

Type species (first in order of arrangement).—*V. lineola.*—Linearis minutissimus. Animalculum omnium minutissimum; monadem termonem exiguitate, fere superans, Vibrioneque Bacillo tricies minus et prorsus diversum. *Motus* tremulus myridaum punctulorum oblongorum obscuriorumque in unica guttula, seu undulatio oculo, lenticula maxime amplificante, exhibetur. In infusione vegetabili sbstantiam aquae post plures dies fere adimpler; in alia foetente ultra trimestre servata, et in non foetente post menesem Lemna cooperta cum Cyclidio glaucomate. He included also *V. bacillus, V. undula,* and later added a number of other species: *V. serpens, V. spirillum, V. rugula,* etc., some of which are regarded as belonging to the bacteria.

Vibrio: (Müller) em. Ehrenberg, 1832.

Abhandl. d. K. Akad. Wiss. Berlin, 1830 (1832), p. 38. Ehrenberg excluded from the genus *Vibrio* the "sinuous" forms which he placed in the genus *Spirillum*, including under the genus *Vibrio*, the straight, flexible rods.

Vibrio: (Müller) emend. Cohn, 1872.

Beit. f. Biol. d. Pflanz., Cohn. Heft. 2, Breslau, 1872, p. 178. Wavy, bent threads.

V. rugula Müller: Threads thick with a single curve. *V. serpens* Müller: Thin threads, with several wavelike curves.

Vibrio: (Müller) emend. Zopf, 1885.

Die Spaltpilze. W. Zopf, Breslau, 1885, p. 50. Spiral filaments with spores.

Vibrio: (Müller 1786) emended Buchanan, 1918.[1]

J. Bact., v. 3, no. 6, 1918, p. 178. Short bent rods, sometimes almost straight, motile by means of a single (rarely two or three) polar flagellum. Aerobic and facultative. Grow well on ordinary media. Frequently liquefy gelatin. Not enlarged near center. No spores. Usually Gram negative.

Type species (original designation).—*V. cholerae.*

Vibriocephalus: Mantegazza, 1851.

Giorn. d. R. Ist. Lomb., c. 3, Milano, 1851, p. 486. Placed it, along with *Spirillum, Bacterium,* etc., among the Infusoria. Asymmetrical infusoria. No visible organs of locomotion. Belong to the family: Vibrionii: Filiform animals, very thin. *Vibriocephalus:* Filiform body, not articulated, with a truncated extremity, the other provided with an oval head. Vacillating motion.

Type species (monotypy).—*V. pignacea,* Diaphanous, cylindrical little animal, with a length of four or five times its breadth, with an oval head one-third length of the body; general form very similar to the human zoosperm.

Vibrion: Pasteur, 1876.[2]

Vibrion septique is a vernacular name used first by Pasteur, but not with generic distinction, and later by many early investigators. It occurs frequently in modern literature, e. g., Lancet v. 2, April, 1919, p. 657. Considered by many authors as synonymous with *Bacillus oedematis.* (See *Clostridium* and *Granulobacillus.*)

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[1] Buchanan points out that if the generic name of *Vibrio* should be suppressed because of the varied meanings assigned to it in the past, *Paccinia* Trevisan would definitely have priority.

[2] It seems very probable that Pasteur never obtained pure cultures of this organism (see Compt. Rend. de l'Acad. des Sci., T. 85, Paris, 1877, p. 101, and Bull. de l'Acad. de Méd., sér. 2, v. 6, p. 781). He points out its morphological differences from the anthrax organism, which he says it resembles very closely in this way, and also in the lesions it produces. Pasteur discovered it by inoculating rabbits and guinea pigs with bits of putrid flesh which produced local oedema and degenerative changes in various organs, a condition which Pasteur termed "septicémie gangreneuse." Miquel and Cambier (Traité de Bact., Paris, 1902, p. 389) state that the *Vibrion septique* is *Bacillus septicus* of French writers.

The Medical Research Committee (National Health Insurance) in their "Reports of the Committee upon Anaerobic Bacteria and Infections," London, 1919, Special Report Series, No. 39, have the following to say regarding the *vibrion septique:* "This microbe has been the center of much controversy; it has, however, become clear that an organism agreeing in characters with Pasteur's *vibrion septique* is of frequent occurrence in wounds. Numerous strains have been isolated and the characters of the bacillus are now perfectly well known. *Vibrion septique* and *B. oedematis maligni* of Koch are probably identical. Many writers subsequent to Koch, such as von Hibler, C. O. Jensen, von Werdt, and others, have, however, repeatedly described *B. oedematis maligni* as liquefying serum

Viscomyces: Rivolta and Micellone, 1879.

According to Buchanan, J. Bact. v. 3, no. 4, July, 1918, p. 198, Missprint(?) of *Discomyces*, Rivolta, 1878.

Winogradskya: Trevisan, 1889.

Gen. e Spec. delle Batteriacee, 1889, p. 12. According to De Toni & Trevisan, Sacc. Syllog. Fung., v. 8, 1889, p. 1028. Baculi cylindracei et filamenta aggregata in familias zooglaeicas repetite ramosas, capsula tenui gelatinosa inclusa. Sporae ignotae.

Type species (monotypy).—*W. ramigera* (Itzingsohn).

Zaogalactina: Schröter, De Toni and Trevisan, and others.

Variant of *Zoagalactina*. Schröter: Krypt.-Flora v. Schlesien, F. Cohn, v. 3, pt. 1, 1885–1889, Pilze, p. 143.

Zoagalactina: Sette, 1820? (1824).

Memoria storico-naturale sull'arrossimento straordinario di alcune sostanze alimentose, osservato nella provincia di Padova l'anno 1819 letta all 'Ateneo di Treviso, ser. 28, April, 1820. Venezia, 1824, p. 51.

Type species (monotypy).—*Z. imetropha.* Cause of "cholera·morbus." According to Trevisan: Rend. Reale Ist. Lomb., Ser. 2, 1879, p. 141, who says it is syn. with *Micrococcus imetrophus* Trevisan. Vuillemin (Ann. Mycologici, v. 11, 1913, p. 523) says it is syn. with *Serratia.*

Zoogloea: Cohn, 1853.

Novorum Actorum Acad. Caesareae Leopold.-Carolin. Nat. Curiosorum, v. 24, Breslau and Bonn, 1854, p. 123. Cellulae minimae, bacilliformes, hyalinae, gelatina hyalina in massa mycosas globosas, uvaeformes, mox membranaceas consociate, dein singulae elapsae, per aquam vacillantes.

Type species (monotypy).—*Z. termo.* Cellulis liberis mobilibus, rectis, 1/2000 to 1/700 inch aequantibus. Syn. (Cohn). *Palmella infusionum* Ehrenberg. *Micraloa teres* von Flotow, *Bacterium termo* Dujardin, *Vibrio lineola* Ehrenberg.

NOTE.—Cohn later abandoned this as a generic name, retaining the term as descriptive of one of the stages in the evolution of bacteria of certain species.

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and digesting meat with the production of a putrid odor. These reactions do not obtain in pure cultures of undoubted *vibrion septique,* the inference being that these writers and even certain quite recent workers, such as Conradi and Bieling, were dealing with impure cultures.

"Confusion has also arisen in the tendency to consider *vibrion septique* as identical with *B. chauvoei* (bacillus of Rauschbrand). This is undoubtedly an error. *B. chauvoei* is quite distinct from *vibrion septique*, but strains of *vibrion septique* have been isolated from cases which appeared clinically to be symptomatic anthrax and also from accidental wounds in animals.

"*Morphology* [of *vibrion septique*]: A Gram-positive organism; it is motile in young cultures and in the exudate from infected animals. It presents a rather wide range of different forms according to the conditions of the culture. In broth or in meat medium the organisms appear as rods of varying length somewhat more slender than *B. welchii.* Spores are readily formed and are usually situated toward one extremity; central spores are, however, not uncommon. Deeply stained bulblike types may be present, especially in young cultures. In fluid media containing fresh tissue and on coagulated serum very varied appearances may be seen, such as 'navicular,' or 'citron' types, i. e., pale, citron or boat shaped bodies with deeper staining points at one or both extremities, deeply staining club-shaped forms, filaments, and bulblike types often growing in short chains. The navicular forms may be observed in films made directly from infected tissues and blister fluid, etc. * * * A strict anaerobe; rancid odor, but not putrid, when grown in meat medium, with color varying from bright red to pink—no blackening; acid and clot in milk with some gas (3 to 6 days); no liquefaction of coagulated serum; gelatin liquefied; no fermentation of glycerine, saccharose, inulin, mannit or dulcit, while glucose, laevulose, galactose, maltose, lactose, and salicin are fermented. Pathogenic to pigeons, guinea pigs, mice, rabbits, and dogs.

Zopfiella: Trevisan, 1885.

Atti d. Accad. fisio-medico-statis. in Milano, ser. 4, v. 3, 1885, p. 93. Three stages of vegetative development: 1. Filaments. 2. Bacilli. 3. Cocci. Filaments are the typical protoplasmic stage; cylindric, articulate, colorless, of two types: macrobacilli and microbacilli. The cocci (final stage) are derived from the microbacilli, and are at first in short chains, finally free. Spores.

Type species (monotypy).—*Z. tumescens.* Syn. *B. tumescens.*

Zopfius: [1] Wenner and Rettger, 1919.

J. Bact. v. 4, No. 4, Baltimore, July, 1919, pp. 334 and 350. Cells rod-shaped, usually about 0.8 by 3.5μ in size, have somewhat rounded ends, and in young cultures occur in long evenly curved chains. Gram-positive. Motile by means of peritrichiate flagella. No spores. No capsules. Facultative anaerobes. No visible change in litmus milk. Gelatin not liquefied and none of the carbohydrates are attacked. A more or less characteristic spider-web growth on agar and gelatin plates, but inoculations in the condensation water of agar slants do not result in a spreading over the surface such as occurs in the genus *Proteus.* The authors include here *Bacterium zopfii* Kurth, and *Proteus zenkeri* Hauser, which they regard as identical, after a study of a number of strains of each type finding few differentiating properties. See *Proteus* (Hauser) em. Wenner and Rettger. The name *Zopfius* having been chosen as the name for this new genus, the type species (by virtual tautonomy) would be *Zopfius zopfii* (Kurth) Wenner and Rettger. See *Kurthia.*

Zymosotis: Salisbury, 1868.[2]

Microscopic examination of the blood; and vegetations found in variola, vaccinia, and typhoid fever. J. H. Salisbury, New York, 1868, 65 pp.

Z. regularis.—Spores very minute, well defined in outline, and uniform in size and shape. Multiply by duplicative segmentation, and develop into filaments with great rapidity. Filaments are well defined, uniform in diameter, and have cross markings or interruptions in the inside tubular membrane at regular intervals, hence its name. Found in human blood.

Z. escularis.—The filaments in their early stages of development are mostly moniliform. The more mature filaments have the outside tube continuous and uniform in diameter, while the inside membrane has not only interruptions at irregular intervals, but the interruptions are of variable length. Where the inside membrane occurs it affords a double wall to the tube and communicates greater opacity than have the intervening spaces. Found in the freshly drawn blood of horses affected by a fatal disease characterized by a remittent fever.

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[1] This new genus is introduced by Wenner and Rettger to include the two species above mentioned which have formerly been placed under *Proteus, Bacterium* or *Bacillus.* They separate them from *Proteus* as defined by them, because of their inability to attack carbohydrates, their nonliquefaction of gelatin, their retaining of the dye when stained by Gram's method, etc.

[2] Salisbury undoubtedly was working with mixed growths. He speaks of these species as "algoid vegetations." Most authors have omitted them from either the Hyphomycetes or the Schizomycetes. Marchand (Bot. Crytogamique, t. 1, Paris, 1883, p. 470) seems to think that this genus, together with three others created by Salisbury (*Crypta, Byolysis,* and *Ios*), belong near or with the schizomycetes. He considers that *Entophycus* Salisbury belongs to the Mucedinaceae.

Zygobacterium: Maggi, 1887.

Acque Potabili, 1887, p. 318, fig. 184. According to De Toni and Trevisan in Saccardo's Sylloge Fungorum, v. 8, 1889, p. 1023.

Type species (monotypy).—*Z. nitrosum.* Syn. (De Toni and Trevisan) *Bact, lineola* (Müller, Cohn).

LIST OF SPECIES.

aceti, Kützing, 1833–1837 (Hansen). Ulvina. Type. See also Acetimonas, Arthrobacterium, Nosema, Acetobacter, Bacillopsis, Umbina, Mycoderma, Torula.

aceti, Furhmann, 1905. Thermobacterium.

actinomyces, Trevisan, 1889. Nocardia.

aerogenes, Miller, 1886. Helicobacterium.

aerogenes capsulatus,[1] Welch & Nuttall, 1892 [Bacillus]. See Granulobacillus and Clostridium.

aeruginosa (Kützing, Microhaloa) Henfrey, 1856. Clathrocystis. Type.

agile, Jensen, 1909. Denitrobacterium.

agilis, Beijerinck (?) 1901. Azotobacter.

agilis (Cohen) Migula, 1894. Planosarcina.

agilis, Ali Cohen, 1889. (Micrococcus) Winslow and Rogers. Rhodococcus.

aggregatum, Lauterborn, 1906. Chlorochromatium. Type.

aggregatum, Lauterborn. Chlorochromatium, Cylindrogloea.

alba, Vaucher (Oscillaria), Trevisan. Beggiatoa. Type.

albae, Forti, 1901. Oenobacillus. Type.

albida, Trevisan, 1889. Cenomesia.

album, Lindner, 1887 (?). Termobacterium.

albus, Lindner, 1887. Pediococcus.

alvei, Cheshire and Cheyne, 1888. Cornilia.

americanus, Buchanan, 1918. Nitrosococcus. Type.

amylifera, Nadson, 1914. Thiosphaerella. Type.

amylobacter, Van Tieghem, 1877. Granulobacter.

amylophilum, Makrinov, 1916. Pectinobacter. Type.

amylovora, *Burrill*, 1883 (Bacillus). Erwinia.

anceps, Trevisan, 1889. Rasmussenia.

anserina, Sacharoff, 1891. Spiroschaudinnia.

anthracis, Davaine (Cohn, Koch). Aplanobacter. Type. See also Bacillus.

apiculatum, Troili-Peterson, 1903. Brachybacterium.

aquatilis, Nissen, 1889. Coccus.

arachnoidea (Agardh), Rabenhorst, Eubeggiatoa.

arborescens, Trevisan, 1889. Nocardia.

articulata (Ehrenberg), Trevisan, 1879. Mantegazzaea.

articulatum, Ehrenberg, 1838. Mantegazzaea.

ascoformans, Johne, 1885 (Micrococcus). Botryococcus. Botryomyces, Bollingera.

asterospora, Meyer, 1897. Astasia. Type.

atoma, Bory de St. Vincent, 1824. Melanella.

aureus, Rosenbach, 1884. (*Staphlyococcus pyogenes aureus* Rosenbach.) Aurococcus. Type. See also Staphylococcus. Type.

aurantiaca, Berkeley and Curtis, 1857. Stigmatella.

aurantiacus (Schröter, 1886), Cohn. Micrococcus.

aureus, Thaxter, 1892. Myoxobacter.

avicidus, Gamaleia, 1888. Coccobacillus. Type. See also Pasteurella.

bacillosus, Winogradsky, 1888. Amoebobacter.

bacillus, Müller, 1773. Vibrio. See also Bactrella, Enchelys, and Metallacter.

bacillus (Müller, 1773), Perty, 1852. Metallacter. Type.

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[1] Com. Soc. Am. Bact. (J. Bact., v. 5, No. 3, 1920, p. 222) place this species under *Clostridium* (Trécul) Prazmowski.

bactifera, Perfiliev, 1914. Cylindrogloea.
beigelianum, Hallier, 1868 (Sclerotium). Chlamydatomus.
beigelii Küchenmeister and Rabenhorst, 1867. Pleurococcus. See also Chlamydatomus, and Hyalococcus.
beijerinckii, Jensen, 1909. Rhizomonas.
betae, Gonnerman, 1907. Myxobazillus.
betae, Gonnerman, 1907. Myxokokkus.
bicolor, Ehrenberg, Eumonas.
biflexa, Wolbach and Binger (?), Leptospira.
billrothii, Cohn, 1875. Ascococcus Cohn. Type. See also Ascobacillus.
bipunctata (Molisch), Wislouch, 1914. Thiospira.
bornetii, Guignard, 1890. Streblotrichia. Type.
bombycis, Nägeli, 1857. Nosema. Type. See also Panhistophyton.
botryogenes, Rabe (Micrococcus), 1886. Botryococcus, Botryomyces, Bollingera.
botulinus,[1] van Ermengem (Bacillus), 1917. Botulobacillus.
bovis, Babès, 1889. Haematococcus.
bovis, Czaplewski, 1900. Corynethrix.
bovis, Harz, 1877. Actinomyces. See also Oospora.
braunii, Kützing, 1849. Botryococcus. [Alga.]
brevis endocarditidus, Weichselbaum, 1887. Diplobacillus.
buccalis, Robin and Lebert. Leptotrichia.
buccalis, Robin and Lebert (Trevisan, 1889). Rasmussenia.
buccalis, Robin, 1847. Leptothrix. Type.
buccalis, Lewis, 1884. Microspira.
bulbali, Trevisan, 1887. Pasteurella.
butylicus (Grüber), Migula, 1900. Granulobacter.
butylicum, Beijerinck, 1893. Granulobacter.
butyri, Klecki, 1894. Tetracoccus. Type.
butyricum, Prazmowski, 1880. Clostridium. Type.
callitrichae, Kützing, 1837 (an alga). Sclerothrix.
capsulatum, Molisch, 1907. Rhodonostoc. Type.
capsulatum, Molisch, 1907. Rhodobacterium. Type.
capsulatus, Foà and Bordoni-Uffreduzzi, 1888 (Diplococcus). Meningococcus.
capsulatus, Molisch, 1907. Rhodococcus.
capsulatus cuniculi, Koppanyi, 1907. Pyobacillus. Type.
capsulatus pyaemiae cuniculi, Koppanyi, 1907. Pyobacillus.
candicans, *Flügge*, 1886. Albococcus.
canescens, Migula, 1899–1900. Albococcus.
casei, Freudenreich (Bacillus). Caseobacterium.
catenata, van Tieghem, 1880. Polybacteria.
caucasica, Kern, 1882. Dispora. Type.
caucasicus (Kern) Beijerinck. Lactobacillus.
cellaris, Schröter, 1883. Leucocystis, Chlamydatomus.
cellaris, Hansgirg, 1888. Mycothece.
centrale, Oersted, 1884. Agonium. Type.
cerevisiae, Balcke, 1884. Pediococcus.
chauvoei,[1] Arloing, 1887 (Bacillus). Butyribacillus. See also *Vibrion septique.*
chlorina, Lauterborn, 1913. Pelogloea. Type.
chlorinus, Cohn, 1872. Micrococcus.
cholerae (Pacini, 1854), Trevisan, 1889. Pacinia. See also Vibrio.

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[1] Com. Soc. Am. Bact. (J. Bact., v. 5, No. 3, 1920, p. 222) place this species under *Clostridium* Prazmowski.

cholerae (Koch), Buchner. Vibrio. Type.

cholerae, Koch, Buchner, Jensen (?), 1909. Liquidovibrio.

cholerae-asiaticae (Zopf, Flügge), Trevisan, 1889. Pacinia.

cholerae-gallinarum (Zopf), Trevisan, 1884. Octopsis. See also Pasteurella.

chroococcum, Beijerinck, 1901. Azotobacter. Type. See also Parachromatium.

cienkowskii, Trevisan, 1879. Mantegazzaea.

cienkowskii, Metchnikoff, 1889. Spirobacillus. Type.

cinnabareus, Flügge, 1886. Rhodococcus.

citreus, Vincenzi, 1897. Tetragenus.

citreus (Menge), Migula, 1894. Planococcus.

citreus, Unna and Tomasoli, 1889. Ascobacillus.

clathratiforme (Szafer), Lauterborn, 1913. Pelodictyon. Type.

clathratiformis, Szafer. Pelodictyon.

cohnii, Perty, 1852. Pelosigma. Spiromonas.

coli, Escherich, 1886. Bacterium (emendation of Winslow et al).

coli commune, Escherich, 1886. Aerobacter.

comma, Schröter, 1886. Microspira.

commune, Maassen, 1905. Semiclostridium. Type.

coralloides, Thaxter, 1892. Myxococcus.

coryzae, Klebs, 1887. Diplokokkus.

cristatus, Leidy, 1850. Arthromitus. Type.

crepusculum, Ehrenberg, 1838. Monas.

crocatus, Berkeley and Curtis, 1857. Chondromyces. Type.

crouposa, Trevisan, 1885. Klebsiella. Type.

cubica, van Tieghem, 1880. Punctula.

cumulus minor, Miller, 1892. Coccus.

cylindric, Ehrenberg, 1838. Bacterium.

delbrucki, Beijerinck (?), 1901. Lactobacillus.

denitrificans, Beijerinck 1904. Thiobacillus.

denitrificans, Burri and Stutzer, 1895. Denitromonas.

denitrificans agilis, Ampola and Garino, 1896. Denitrobacterium.

dentium, Hoelling (?), 1910. Fusiformis.

deses, Ehrenberg, 1832. Bacterium.

dichotoma, Cohn, 1873. Cladothrix. Type. See also Erysipelothrix.

diffluens, Müller, 1786. Proteus (an amoeba?).

diphtheriae (Klebs, 1883), Löffler, 1884, Migula. Corynebacterium.

discophora, Schwers, 1912. Megalothrix. Type.

distortus, Ducleaux, 1882. Tyrothrix.

divergens, Kützing. Leptomitus.

dunbari, Miquel and Cambier, 1902. Photospirillum.

duplex, Brussoff, 1916. Ferribacterium. Type.

duttoni, Novy and Knapp, 1906. Spiroschaudinnia.

edingtoni, Trevisan, 1889. Ascobacillus, Klebsiella.

elegans, Winogradsky, 1888. Thiodictyon.

enchelys, Ehrenberg (?), 1832. Bacterium.

epiphytica, Migula, 1895. Chlamydothrix.

equi, Rivolta, 1878 (Discomyces). Botryococcus, Botryomyces, Bollingera.

equi, Mori, 1913. Caryobacterium.

equorum, Trevisan, 1884. Octopsis.

erectus, Schröter, 1886. Cystobacter.

erysipelatis, Lippincott's Medical Dictionary, Philadelphia, 1910. Streptococcus. Variant (?) of *S. erysipelatos* Rosenbach, 1890.

erysipelatos, Rosenbach, 1884. Streptococcus.

erysipelatosus, Klebs, 1887. Streptokokkus.
erysipeloides, Rosenbach, 1909. Erysipelothrix.
erysipeloidis, Trevisan, 1879. Babesia.
erythromyxa, Zopf, 1891. Rhodococcus.
erythrosporos (Cohn, 1879), Schröter, 1886. Streptobacter.
europea, Winogradsky, 1892. Nitrosomonas.
farcinica, Trevisan, 1889. Nocardia.
felis, Rivolta, 1887. Cocco-bacterium. Type.
fermentum, Beijerinck (?), 1901. Lactobacillus.
ferruginea, Ehrenberg, 1836. Gallionella, Chlamydothrix, Didymohelix (type), Gloesphaera, Gloeotila, Nocardia.
ferrugineum (Ehrenberg), Trevisan, 1889. Meloseira. See also Nodofolium.
ferrugineum, Ehrenberg (Ellis), 1907. Spirophyllum. Type.
filiformis, Ducleaux, 1882. Tyrothrix.
filiformans lodzensis, Bartoszewicz and Schwarzwasser, 1908. Tetradiplococcus.
filum, Morren, 1830. Bactrella.
finckleri (Koch, 1884), Schröter, 1886. Microspira.
fischeri, Beijerinck, 1889. Photobacterium.
fischeri, Küttner, 1895. Pyobacterium. Type.
fischeri, Küttner, 1895. Pyobacterium. Type. See also Eiterbacterium.
flaccidifex, Glaser and Chapman, 1912. Gyrococcus. Type.
flavescens, Arloing, 1889. Pneumococcus.
flexuosa, Müller, 1786. Vibrio. See also Melanella.
fluitans, Bigula, 1895. Chlamydothrix.
fluorescens (Flügge), Migula, Jensen, 1909. Liquidomonas.
fluorescens liquefaciens, Flügge, 1886 (Kruyff). Lipobacter. See also Liquidomonas.
fluorescens longum (Zimmermann) Fischer, 1895. Bactrillum.
foesteri, Cohn, 1875. Cohnistreptothrix. Type.
foesteri, Cohn, 1875 (Trevisan, 1889). Streptothrix. Type. See also Nocardia.
foetidum, Jacqué and Masay, 1912. Streptobacterium.
formae novae, Rullmann, 1897. Nitrosobacterium.
freudenreichii, Guillebeau (Micrococcus). See Karphococcus.
fulvus, Cohn, 1875 (Winslow and Rogers, 1906). Rhodococcus.
fulvus, Ehrenberg, 1828. Spirodiscus. Type.
fungorum, Linné. Chaos.
fusca, Schorler, 1904. Clonothrix. Type.
fuscum, Ehrenberg, 1832. Bacterium.
fuscus, Schröter, 1886. Cystobacter.
fusiformis (Hoelling]). 1910. Fusiformis.
gallinarum (Klein,) Blanchard, 1905. Spiroschaudinnia.
gallinarum. Swellengrebel, 1907. Borrelia. Type.
gelatinosa, Miyoshi, 1897. Thiosphaera. Type.
gelatinosa, Molisch, 1907. Rhodocystis. Type.
gelatinosa, Winogradsky, 1888. Thiothece.
germinans, Stutzer and Hartleb, 1901. Nitromicrobium.
gigantea, Miller. Rasmussenia.
giganteum, Molisch, 1907. Rhodospirillum.
gigas Billroth, 1874. Streptobacteria.
gigas pericardii, Billroth, 1874. Streptobacteria.
glomerata, van Tieghem, 1880. Punctula.

glossophila, Trevisan, 1889. Dicoccia. Type.

gonorrhoeae, Salisbury, 1868. Crypta.

gonorrhoeae, Trevisan, 1889. Neisseria.

gonorrhoeae, (Neisser?) Migula, 1895. Gonococcus.

gonorrhoeae, Zopf, 1885. Merismopedia.

gonorrhoicus, Klebs, 1887. Diplokokkus.

gracile, Perty, 1852. Sporonema. Type.

grandis, Gross, 1911. Saprospira. Type.

granula, Winogradsky, 1888. Amoebobacter.

granulomatis, Beaufaire-Arago and Vianna, 1913. Calymmatobacterium.

gregarium, Cohn, 1873. Myconostoc. See also Spirosoma.

grevillii, Agardh, 1828. Haematococcus. Alga.

guilliermondi, Chatton and Perard, 1913. Oscillospira.

gutta-cerei, Arloing, 1889. Pneumococcus.

haeckeli, Wolff, 1907. Pedioplana. Type.

hartwigi, Frenzel, 1897. Modderula. Type.

hercynicum, Römer, 1845. Erebonema. See also Leucocystis.

hoffmanni, Gruber, 1891. Micromyces.

horkelii, Mayen, 1827. Actinomyce.

hortulensis, Beijerinck (?) 1900. Saccharobacter.

hyalina, Müller, 1786. Vibrio. See also Gonium, Lampropedia, Merismopedia, Streptothrix, and Chlamydothrix.

icterohaemorrhagiae, Inado and Ido, 1914. Leptospira.

icteroides, Noguchi, 1918. Leptospira.

imetropha, Sette, 1820. Zoagalactina.

imetrophus, Trevison, 1879. Zoagalactina.

immobilis, (Schattenfroh and Grasberger) Fischer, 1895. Paracloster.

inanis, Ehrenberg, 1828. Monas.

indicum, Beijerinck, 1889. Photobacterium.

influenzae, (Pfeiffer 1892) Lehmann and Neumann, 1896. Hemophilus.

infusionum, Ehrenberg (Palmella) 1838. Zoogloea.

insectorum, Robin, 1847. Leptothrix.

intracellularis (Weichselbaum) Kraus, 1913. Meningococcus. See also Meningokokkus.

intracellularis meningitidis, Weichselbaum (Diplococcus), 1887. Meningokokkus.

investans, Borzi, 1878. Ophyrothrix.

israeli, var. *spitzi*, Sampietro, 1908. Actinobacterium.

israeli, Kruse, 1896. Cohnistreptothrix.

japonicum, Kirchner, 1895. Rhizobacterium. Type.

jenensis, Ehrenberg, 1838. Ophidomonas. Type.

johnei, Klebs, 1887. Ascokokkus.

jonesi, Dutton, Todd and Tobey, 1906. Spiroschaudinnia.

jurgensi, Stempel, 1916. Strickeria.

klebsii, (Escherich) Miller, 1886. Helicobacterium.

kochii, Metchnikoff, 1888. Sclerothrix. Type.

komma (Schröter) Migula, 1894, variant of *comma* Schröter. See Microspira.

lactis, Beijerinck, 1901. Lactococcus.

lactis, Guillebeau, 1890. Galactobacterium.

lactis, Guillebeau, 1890. Chlorobacterium. Type.

lactis acidi, Liebmann, 1896. (Migula, v. 2, 1900, p. 405) or Leichmann (Troili-Peterson, 1903, p. 138). Brachybacterium.

lactis acidi, Marpmann, 1886. Sphaerococcus. Type.
lactis aerogenes, Escherich, 1886. Aerobacter.
lactis viscosum, Adametz, 1891. Actinobacterium.
laevigata, Banks and Soland, 1769. Merista.
lagerheimii, Trevisan, 1889. Schuetzia.
laminariae Trevisan, 1889. Billetia. Type.
lanceolatus, Foa and Bordoni-Uffreduzi, 1888. Diplococcus. See also Meningococcus.
laughlini, Trevisan, 1889. Schuetzia.
lebensis, Rist and Khoury, 1902. Streptobacillus.
leguminosarum, Frank, 1890. Rhizobium. Type. See also Phytomyxa, Schinzia, Pseudorhizobium, Rhizobacterium and Rhizomonas.
lens, Müller, 1773. Monas.
leprae (Hansen, 1872), Lutz, 1886. Coccothrix.
·*leptomitiformis*, Menenghini 1842 (?). Oscillaria. See also Beggiatoa.
lichenoides, Arloing, 1889. Pneumococcus.
lignieresi, Brumpt, 1910. Actinobacillus. Type.
lilacina, Trevisan, 1889. Cenomesia.
limicola, Nadson, 1906. Chlorobium. Type.
lineola, Müller, 1773. Vibrio. Type. See also Melanella, Zygobacterium and Zoogloea.
liquefaciens, Tataroff, 1891. Aerobacter.
liquefaciens bovis, Arloing, 1889. Pneumobacillus. Type. See also Pneumococcus.
littoralis, Rabenhorst (?). Merismopedia. See also Thiopedia.
littoralis, Oersted, 1840–41. Erythroconis.
luminosum, Beijerinck, 1889. Photobacterium.
luteola, Schmidle (Aphanothece). Schmidlea. Type.
luteum, Babès, 1890 (?). Ascobacterium. Type.
lycopersicum, Groenewege, 1912. Phytobacter.
magnus, Miller, 1888. Jodococcus.
major, Molisch, 1910. Siderocapsa.
malariae, Klebs and Tomassi. Coccothrix.
mallei, Löffler and Schütz, 1881. Corynebacterium.
mallei, [Löffler, 1886[1] (Bacillus)], Buchanan. Pfeiferella. Type.
marcescens, Bizio, 1827. Serratia. Type.
maxima, Trevisan, 1889. Rasmussenia.
megaterium, de Bary, 1884. Bactridium.
megatherium, de Bary, 1884 (Beijerinck). Saccharobacter.
melanogenum, Beijerinck (?), Acetobacter.
merismopoedioides, De Bary (?), 1884. Arthrobacterium.
mesenterioides, Cienkowski, 1878 (van Tieghem). Leuconostoc.
methanicus (Söhngen, 1906), Jensen. Methanomonas.
methanigenes, Jensen, 1909. Celluobacillus.
mica, Müller, 1773. Monas. Type.
minor, Molisch, 1907. Rhodococcus.
minutula, Brébissant. Meloseira.
mirabile, Buder, 1914. Chloronium. Type.
mirabilis, Hauser, 1885. Proteus.
mirabilis, West and Griffiths, 1909. Hillhousia.
mirifica, Rabenhorst, Palmella.
mirificus (Rabenhorst), Trevisan, 1889. Palmella.

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[1] According to Committee, Soc. Am. Bact., in J. Bact., v. 5, No. 3, Baltimore, 1920, p. 200.

mobiusii, Engler, 1883. Cladomyces. Type.

monadina, Bory de St. Vincent, 1824. Melanella.

monas (Müller), Ehrenberg. Bacterium.

moniliformis, Müller, 1783. Gaillonella.

mucor (Oersted, 1844), Trevisan. Leptotrichia, Leucothrix.

mucosum anaerobicum, Klinger, 1912. Cocobacterium. Type.

multiseptata, Engler, 1883. Phragmidiothrix.

multisporus, Dangeard, 1890–91. Eubacillus.

mülleri, Petschenko, 1911. Drepanospora.

muris (Hoelling), 1910. Fusiformis.

murisepticus, Rosenbach, 1909. Erysipelothrix.

mycetomi, Laveran. Madurella.

mycoides, Borrel, Dujardin-Beaumet, Jeantet and Jouan, 1910. Asterococcus. Type.

nana, Gross, 1911. Saprospira.

natans, Kützing, 1833. Sphaerotilus. Type.

neisseri, Lindau, 1898. Gonococcus.

nitidus, Leidy. Arthromitus.

nitrosomonas, Lehmann and Neumann, 1897 (?). Nitrosomonas.

nitrosum, Maggi, 1887. Zygobacterium.

nivea, Rabenhorst. Leptonema [alga].

nivea, Winogradsky, 1888. Thiothrix. Type.

nocardi, Haass (?), 1906. Actinocladothrix.

noltii, Agardh, 1828. Haematococcus. Alga.

noscomii viennensis, Billroth, 1874. Siphonomyxa.

nummuloides, Dillwyn, 1802 [Conferva, an algal genus]. See Gaillonella.

obermeieri, Cohn, 1875. Punctum.

ocellus, Müller, 1773. Monas.

ochracea (Leiblein), Kützing, 1843. Leptothrix. Type. See also Chlamydothrix, Nodofolium.

ochracea, Roth, 1797. Detoniella, Oscillatoria, Leptothrix.

ochraceus, Rosenthal. Micrococcus.

oedematis, Liborius, 1886. Vibrion septique.

oedematis-maligni, Hesse. Cornilia. See Clostridium and Vibrion.

okenii, Ehrenberg, 1838 (Monas). Chromatium. Type.

oligocarbophilus, Beijerinck and van Delden (Bacillus). Carboxydomonas.

ollare, Persoon, 1822. Mycoderma.

orbicularis, Ravenel. Micrococcus.

ostrajanini, Nedrigailov, 1907. Melococcus. Type.

ovatum, Lebert, 1856. Panhistophyton. Type. See also Bacteriopsis and Nosema.

ovina, Blanchard (1906). Sprioschaudinnia.

oxaliferum, Schewiakoff, 1893. Achromatium. Type. See also Modderula.

pallida, Schaudinn, 1904 [Spirochaete]. Spironema.

pallidum, Schaudinn, 1905. Treponema. Type. See also Spironema and Microspironema.

paludosum, Fischer, 1895. Plectridium.

palustris, Molisch, 1907. Rhodobaccillus. Type.

pantotrophus, Kaserer, 1905. Hydrogenomonas.

parasitica (Kützing) Trevisan. Leptotrichia.

parvus, Molisch, 1907. Rhodovibrio. Type.

parvus, Miller, 1888. Jodococcus.

parvus, Billroth, 1874. Ascococcus. Type.

pasteurianum, Hansen, 1879. Bacteriopsis.

pasteuri, Miquel, 1889. Cornilia.

pasteurii, Miquel, 1889. Urobacillus. Type.

pastorianum, Hansen, 1879. Arthrobacterium.

pastorianus, van Laer, 1892. Saccharobacillus.

pastorianus, Beijerinck, 1898. Acetobacter.

pectinis, Gross, 1910. Cristispira. Type.

pellucidum, Fischer, 1894. Halibacterium.

pendens, Molisch, 1906. Rhodothece. Type.

pericardii, Billroth, 1874. Streptobacteria.

perlibratus (Beijerinck?). Diffusionsbacillus.

peroniella, Klein, 1889. Paraplectrum.

phosphorescens, Beijerinck, 1889. Photobacterium.

photometricum, Molisch, 1907. Rhodospirillum. Type.

pignacea, Mantegazza, 1851. Vibriocephalus. Type.

pituitoparus, Hohl, 1902. Karphococcus.

pleuro-pneumoniae, Schutz, 1887 (?). Diplostreptococcus.

plicatilis, Ehrenberg, 1834. Spirochaeta. Type. See also Spirulina.

pneumoniae, Weichselbaum, 1886. Diplococcus. See also Hyalococcus.

pneumoniae, Schröter, 1886 (Freidlander, 1882). Leucocystis.

pneumoniae-crouposae, Zopf. Klebsiella.

pneumonicus, Bonôme, 1888. Pseudodiplococcus. Type.

polymorphum, Fischer, 1894. Halibacterium.

polymorphus, Ducleaux, 1882. Actinobacter. Type.

polymyxa, Prazmowski, 1880. Granulobacter.

polyspora, Chatton and Perard, 1913. Metabacterium.

polyspora, Cohn, 1870. Crenothrix. Type.

porci, Rosenbach, 1909. Erysipelothrix.

prodigiosa, Ehrenberg, 1839. Palmella, Monas, Micrococcus.

prodigiosum. (Ehrenberg, 1839) Schröter, 1872. Bacteridium. See also Liquidobacterium.

prodigiosus (Ehrenberg, 1839), Flügge, Cohn. Coccobacterium. Type (?). See also Serratia.

prowazeki, da Rocha Lima, 1916. Rickettsia. Type. See also Dermacentroxenus.

pseuodiphtheriticum, Löffler, 1887. Corynebacterium.

pseudopulcher, Beijerinck, 1900. Proteobacter.

pseudo-termo, Fischer, 1895. Bactrillum.

pulmonis equi, Bollinger, 1869 (Zoogloeae). Botryococcus, Bollingera, Botryomyces.

punctata, Meyen, 1828. Merismopedia.

punctata, Trevisan, 1842. Beggiatoa.

punctum, Müller, 1786. Monas. See also Melanella and Bacterium.

punctum, Poulsen, 1879. Sarcinaglobulus. Type.

putrificus, Flügge, 1886. Putribacillus.

pyocyanea [Gessard, 1882; Migula, 1900, (Bacillus)] Jensen, 1908. Liquidomonas.

pyocyaneus (Gessard, 1882), Fischer. Bactrinium.

pyogenes, Rosenbach, 1884. Streuptococcus. Type. See also Pyococcus.

pyogenes, Rosenbach, 1884. Streptococcus, Albococcus. Type.

pyogenes albus, Rosenbach, 1884. Staphylococcus.

pyogenes aureus, Rosenbach, 1884. Staphylococcus.

pyosepticus, Fortineau, 1905. Erythrobacillus.

radians (Kützing), Trevisan, 1889. Leptotrichia.

radiatus, Luderitz, 1889. Cornilia.

radicicola, Beijerinck (Bacterium), 1888. Rhizomonas, Rhizobium.

ramigera (Itzigsohn), Trevisan, 1889. Winogradsky.

ramosa, Famintzin, 1891. Nevskia. Type.

ramosa, Metchnikoff, 1888. Pasteuria. Type. See also Nevskia.

ramosum, Hartleb, 1900. Pseudorhizobium.

rasmusseni, Trevisan, 1885. Bacteriopsis.

recurrentis (Lebert,[1] 1874). Spiroschaudinnia.

reitenbachii, Caspary, 1874. Merismopedium.

rhenanus, Migula, 1899–1900. Albococcus.

rhodochrous, Zopf, 1891. Rhodococcus.

rhusiopathiae, Rosenbach, 1909. Erysipelothrix.

rigidula (Kützing), Trevisan, 1889. Leptomitus, and Leptotrichia.

rosa, van Tieghem 1880. Punctula.

rosea, Kützing, 1837. Michrohaloa. See also Lamprocystis.

rosea, Cohn, 1875. Rhabdomonas. Type. See also Rhabdochromatium.

rosea[2] (Schröter), Winogradsky. Thiosarcina. Type.

rosea, Winogradsky, 1888. Thiopedia. Erythroconis.

roseo-persicina. Kützing, Schröter (Lamprocystis). Clathrocystis, and Cohnia.

roseo-persicina. Winogradsky, 1888. Thiocapsa. Type.

roseo-persicinus. Rabenhorst (Pleurococcus), Clathrococcus. Type (?). See also Protococcus, Lamprocystis, and Cohnia.

roseum, Miyoshi, 1897. Thioderma. Type.

roseum, Fischer, 1894. Halibacterium.

roseum, Winogradsky, 1888. Rhabdochromatium.

roseum, Lauterborn, 1913. Pelochromatium. Type.

roseum, Winogradsky, 1888. Amoebobacter. Type.

roseus, Flügge, 1886. Rhodococcus.

rotans, Lauterborn, 1906. Pelosphaera.

ruber, Winogradsky, 1888. Thiopolycoccus.

rubescens, Ray Lankester (Bacterium). See Lamprocystis and Clathrocystis.

rubescens, Thaxter, 1892. Myxococcus.

rubrofuscum, Fischer, 1894. Halibacterium.

rubrum, Miyoshi, 1897. Thioderma.

rufa, Winogradsky, 1888. Thiocystis.

rugula, Müller, 1786. Vibrio. See also Melanella.

saccharobutyricum, Beijerinck (?) 1893. Granulobacter. See also Granulobacillus.

saccharobutyricus, von Klecki, 1896. Granulobacillus.

saccharobutyricus immobilis liquefaciens, Schattenfroh and Grassberger, 1899. Granulobacillus.

saccharobutyricus mobilis nonliquefaciens, Schattenfroh and Grassberger, 1899. Granulobacillus.

saccharomyces, Rougentzoff, 1914. Enterococcus.

saltans, Mühlhäuser, 1884. Punctum. Type.

sanguineum, (Ehrenberg) Winogradsky, 1888. Thiospirillum.

sangiuneus, Agardh, 1828. Haematococcus.

scarlatinosa, Trevisan, 1889. Perroncitoa. Type.

schenckii [Fungus] Sporothrix.

schirokikhi, Jensen (?) 1908. Liquidomonas.

schmidlei, Lauterborn, 1907. Thioploca. Type.

scintillans, Ehrenberg, Bacterium.

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[1] According to Manson. 1907, p. 833.

[2] According to Buchanan, J. Bact., v. 3, No. 5, p. 467.

scissipara, Roze, 1898. Chatinella.
seborrhoeae (Sabouraud) Schamberg, 1902. Microbacillus.
septica, Billroth, 1874. Coccobacteria.
septique, Pasteur. Vibrion. See also Clostridium.
septicum, Beijerinck, 1900. Proteobacter.
serpens, Müller, 1786. Vibrio.
simplex, Ehrenberg, 1828. Monas, Bacterium.
simplex, Thaxter, 1892. Myxococcus.
somaliensis, Brumpt, 1906. Indiellopsis.
spinosus, Luderitz, 1889. Cornilia.
spirillum, Müller, 1786. Vibrio. See also Melanella and Spirillum.
spissa (Rabenhorst 1865), Trevisan. Leptotrichia.
spitzi, Lignières and Spitz. Actinobacterium.
splendidum, Beijerinck, 1900. Photobacter.
stylopygae, Petschenko, 1908. Bacillopsis.
subflava, Ravenel, Sarcina.
subtile (Ehrenberg, Cohn) Fischer, 1895. Bactridium.
subtilis (Ehrenberg, 1833), Cohn, 1872. Bacillus.
sulfurea, van Tieghem, 1880. Polybacteria.
suspensa, Molisch, 1906. Rhodocapsa. Type.
synovialis, Chantemesse, 1917. Mycobacillus.
synxanthus, Ehrenberg, 1840. Bacteriopsis, Vibrio.
syphilitica, Salisbury, 1868. Crypta.
syphiliticum, Escherich (?), 1886. Helicomonas. Helikomonas.
taeniata, Lauterborn, 1913. Peloploca.
tardissimus, Altana, 1909. Tetragenus.
tenuis, Ducleaux, 1882. Tyrothrix.
tenuis, Winogradsky, 1888. Thiothrix.
tenuissima, Winogradsky, 1888. Thiothrix.
teres (von Flotow), Cohn. Zoogloea.
termitidis, Hoelling, 1910. Fusiformis.
termo (Dujardin), Cohn, 1853. Zoogloea.
termo, Müller, 1773, Monas. Bacterium.
termo (?), Bactrillum.
termo (Ehrenberg, Cohn). Bacterium, emend. Smith. Type.
tetani (Nicolaier, 1884), Fischer. Plectridium. Type.
tetragena (Mendoza), Migula. Sarcina.
tetragenus, Gaffky, 1883 (or 1881?). Gaffkya.
tetragenus mobilis ventriculi, Mendoza, 1889. Planomerista.
theileri, Laveran, 1904. Spiroschaudinnia.
thermophilum, Ambroz, 1913. Deazotonitraazobacterium, Deazotonitranitriazobacterium, Deazotonitriazobacterium.
thioparus, Beijerinck, 1904. Thiobacillus.
thuretiana, Borzi, 1878. Ophyrothrix, Leptotrichia.
treubii, Molisch, 1910. Siderocapsa.
tremulans, Ehrenberg, 1830. Bacterium, Vibrio.
triloculare, Ehrenberg, 1828. Bacterium. Type. See also Mantegazzaea.
tuberculorum, Vuillemin, 1888. Cladochytrium.
tuberculosis, Koch, 1882. Mycobacterium. See also Coccothrix.
tumescens (Zopf) Trevisan, 1885. Zopfiella.
typhi,[1] Eberthella. Type.
typhi abdominalis.[1] Bactridium.

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[1] Eberth first described the organism causing typhoid fever, but he did not name the species. Klebs described an organism under the name *Bacillus typhosus* (Arch. f. Exp.

ulceris mollis, Unna, 1892. Streptobacillus.
ulvina, van Tieghem, 1880. Ascobacteria. Type.
undula, Müller, 1773. Vibrio, Bactrella.
undula, (Müller) Ehrenberg. Spirillum. See also Vibrio.
undulata, Lauterborn, 1913. Pelploca.
ureae, Cohn, 1872. Micrococcus. Bacteriopsis. See also Merista.
urosporae, Lagerheim, 1900. Sarcinastrum. Type.
vaccinae, Cohn, 1872. Microsphaera. Type.
vandellii, Menenghini. Hygrocrocis.
variabilis, (Rasmussen) Trevisan, 1889. Rasmussenia.
variolae, Klebs, 1887. Tetrakokkus.
vejdovskii, Dobell, 1911. Paraspirillum.
ventriculi, Goodsir, 1842. Sarcina. See also Merismopedia.
ventriculi, (Mendoza) Vuillemin, 1913. Planomerista. Type.
versicolor, Guillebeau, 1890. Galactococcus.
violacea, Schröter, 1880. Pseudomonas. Type.
violacea, Winogradsky, 1888. Thiocystis.
violaceum, Bergonzini, 1881. Cromobacterium. Type.
violaceus, Bergonzini, 1881. Cromococcus. Type.
violascens, Perty, 1852. Chromatium.
virescens, Thaxter, 1892. Myxococcus.
vitellinum, Link, 1795. Polyangium. Type. See also Cystobacter.
volubilis, Perty, 1852. Spiromonas.
volutans, Ehrenberg, 1830. Spirillum. Type.
volutans, Hinze, 1903. Thiophysa. Type.
vulgare, Stutzer and Hartleb, 1901. Hyphomicrobium. Type.
vulgare, (Hauser) Jensen, 1909. Liquidobacterium.
vulgaris, Hauser, 1885. Proteus. Type. See also Liquidobacterium.
vulgaris, Jensen, 1909. Putribacillus.
vulgaris, Tsiklinsky, 1898. Thermoactinomyces.
weichselbaumii, Trevisan. Diplococcus.
weissii, Perty, 1852. Chromatium.
welchii,[1] Migula (Bacillus). See Vibrion septique, and Clostridium.
winogradskyi, Committee Am. Bact. Soc., 1917. Nitrobacter. Type.
winogradskii, (Omelianski) Wislouch, 1914. Thiospira.
xanthogenicus, Freire, 1885. Cryptococcus.
xanthopyreticus, Trevisan, 1889. Streptococcus, Babesia.
xerosis, Neisser and Kuschbert, 1883. Corynebacterium.
xylinum, Brown, 1886. Acetobacterium. Type.
zenkeri, Hauser, 1885. Proteus.
zopfii, Kurth, 1883. Kurthia. Type. See Zopfius.
zopfii, Kurth, 1883. Arthrobacterium. See also Helikobacterium.
zymogenes, Biedert, 1885. Kokkobacillus.

Path. u. Pharm., v. 12, 1879–80, p. 234), which Eberth (Virchow's Archiv., v. 83, 1881, p. 486, and idem, v. 81, 1880, p. 58) states is the same organism as that described by him and which he speaks of as "typhusbacillen," etc. Gaffky (Mitt. aus dem Kais. Gesundheits. Struck, v. 2, Berlin, 1884, p. 385) in reviewing the work done on this disease states that Letzerich (Archiv. f. Exp. Path. u. Pharm., v. 14, h. 3, 1883) considered that his *Micrococcus typhi abdominalis* might really be the same as Klebs's *Bacillus typhosus*. One of the earliest references found for *Bacillus typhi* is in Migula's paper in Engler and Prantl (Die Naturl. Pflanz. Lief. 129, 1 Teil, 1 Abt. *a*, Bog. 1–3, Leipzig, 1896, p. 26), where he gives the name *Bacillus typhi* Gaffky. I have been unable to find Gaffky's use of this species name. *Bacillus typhosus* Klebs is the earliest name I have succeeded in locating, though a complete search has not been made since the object in view is to determine the authorship of genera rather than species

[1] Com. Soc. Am. Bact. (J. Bact., v. 5, No. 3, 1920, p. 222) place this species under *clostridium*.

HYGIENIC LABORATORY BULLETINS OF THE PUBLIC HEALTH SERVICE.

The hygienic laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891, and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

Of the bulletins published by the laboratory since its establishment, copies of the following are available for distribution and may be obtained without cost by applying to the Surgeon General, United States Public Health Service, Washington, D. C.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

No. 43.—The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902). By M. J. Rosenau and John F. Anderson.

No. 44.—Report No. 2 on the origin and prevalence of typhoid fever in the District of Columbia, 1907. By M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle.

No. 45.—Futher studies upon anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 46.—*Hepatozoon perniciosum* (n. g., n. sp.); a hæmogregarine pathogenic for white rats; with a description of the sexual cycle in the intermediate host, a mite (*Lelaps echidnimus*). By W. W. Miller.

No. 50.—Further studies upon the phenomenon of anaphylaxis. By M. J. Rosenau and John F. Anderson.

No. 51.—Chemical tests for blood. By Joseph H. Kastle.

No. 52.—Report No. 3 on the origin and prevalence of typhoid fever in the District of Columbia (1908). By M. J. Rosenau, Leslie L. Lumsden, and Joseph H. Kastle.

No. 53.—The influence of certain drugs upon the toxicity of acetanilide and antipyrine. By Worth Hale.

No. 55.—Quantitative pharmacological studies; adrenalin and adrenalinlike bodies. By W. H. Schultz.

No. 59.—The oxidases and other oxygen catalysts concerned in biological oxidations. By Joseph Hoeing Kastle.

No. 61.—Quantitative pharmacological studies; Relative physiological activity of some commercial solutions of epinephrin. By W. H. Schultz.

No. 65.—Facts and problems of rabies. By A. M. Stimson.

No. 66.—I. The influence of age and temperature on the potency of diphtheria antitoxin. By John F. Anderson. II. An organism (*Pseudonomas protea*) isolated from water, agglutinated by the serum of typhoid-fever patients. By W. H. Frost. III. Some considerations on colorimetry, and a new colorimeter. By Norman Roberts. IV. A gas generator in four forms, for laboratory and technical use. By Norman Roberts.

No. 68.—The bleaching of flour and the effect of nitrites on certain medicinal substances. By Worth Hale.

No. 73.—The effect of a number of derivatives of chlorine and analogous compounds on the blood pressure. By Reid Hunt and R. de M. Taveau.

No. 75.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1908. By Murray Galt Motter and Martin I. Wilbert.

No. 76.—The physiological standardization of ergot. By Charles Wallis Edmunds and Worth Hale.

No. 78.—Report No. 4 on the origin and prevalence of typhoid fever in the District of Columbia (1909). By L. L. Lumsden and John F. Anderson. (Including articles contributed by Thomas B. McClintic and Wade H. Frost.)

No. 81.—Tissue proliferation in plasma medium. By John Sundwall.

No. 84.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1910. By Murray Galt Motter and Martin I. Wilbert.

No. 85.—Index-catalogue of medical and veterinary zoology. Subjects: Cestoda and cestodaria. By Ch. Wardell Stiles and Albert Hassall.

No. 86.—Studies on typhus. By John F. Anderson and Joseph Goldberger.

No. 87.—Digest of comments on the Pharmacopœia of the United States of America (eighth decennial revision) and on the National Formulary (third edition) for the calendar year ending December 31, 1911. By Murray Galt Motter and Martin I. Wilbert.

No. 89.—Sewage pollution of interstate and international waters with special reference to the spread of typhoid fever. VI. The Missouri River from Sioux City to its mouth. By Allan J. McLaughlin.

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No. 100.—Pituitary standardization; a comparison of the physiological activity of some commercial pituitary preparations. By George B. Roth. 2.